

**STRATEGIC ALLIANCE ANNOUNCEMENTS AND NEW VENTURE STOCK
MARKET RETURNS: SIGNALING AND RESOURCE-BASED PERSPECTIVES
ON THE EFFECTS OF PARTNER FIRM, NEW VENTURE FIRM, AND
ALLIANCE CHARACTERISTICS**

A Dissertation

by

R. MICHAEL HOLMES JR.

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2008

Major Subject: Management

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ABSTRACT

Strategic Alliance Announcements and New Venture Stock Market Returns: Signaling and Resource-based Perspectives on the Effects of Partner Firm, New Venture Firm, and Alliance Characteristics.

(December 2008)

R. Michael Holmes Jr., B.S., University of Alabama

Co-Chairs of Advisory Committee: Dr. Michael A. Hitt
Dr. R. Duane Ireland

Firms form marketing and technology alliances to access other firms' resources, and these alliances act as signals to investors. Investors use these signals to adjust expectations about new venture performance prospects, but our understanding of investor responses is incomplete because limited research examines them as a function of factors other than the alliance announcements. To better understand alliances as signals, we must incorporate factors influencing the resources alliances make available. Thus, my research question is as follows: To what extent do partner firm, focal firm, and alliance characteristics provide signals to investors about the resources alliances make accessible? My theory integrates signaling theory and resource-based theory on strategic alliances, and an event study is used to analyze investor responses to alliances formed by high technology new ventures recently having undergone initial public offerings.

The findings provide evidence both in support and in contradiction to signaling theory and resource-based theory on strategic alliances. For example, signaling theory logic suggests both that the visibility and prestige of large partners and that the

uncertainty associated with small and young firms enhance the strength of signals associated with alliance announcements. In this study, there is no support for the former hypotheses and limited support for the latter. Moreover, although both perspectives suggest that the new venture's alliance experience increases investor responses, such effects were not found.

There was some evidence to support the signaling theory argument that signal consistency strengthens responses. Specifically, investors respond favorably to marketing alliances when the new ventures' alliance partners have strong commercial resources (many new products per year). There is also evidence that investors respond to the possibility of resource complementarity, contingent on which firm has the resources that complement the alliance. For instance, investors value marketing alliances when new ventures have strong R&D resources. In technology alliances, investors may respond more favorably when new ventures have strong commercial resources (high advertising intensity), but may respond negatively when partners have such resources. In sum, this study provides some support for signaling theory and resource-based theory on strategic alliances, but also provides null results that are inconsistent with either.

DEDICATION

I dedicate this dissertation to my father, Robert Michael (Micky) Holmes, who was born August 15, 1952 and passed away June 13, 2008. There is no doubt that I am who and where I am because of you, Dad. You were the best father for whom one could ask. You were also my teacher, my soccer coach, the best man in my wedding and in the truest sense of the word, and my friend.

You taught me through both your words and your example to be the best that I can be. Through this lesson, you meant that I should use the gifts God gave me in the service of others, so I might leave the world a better place than I found it. This approach to life is why I followed you into education. You taught me to love others – strangers, friends, and family – as He loves us. You also taught me to be humble and to remember that everything we have is a gift that can be taken away as surely as it was given. You were always a teacher, both personally and professionally. In the end, you taught me to keep pushing, struggling, and fighting until He decides that it is time to stop.

I deeply regret that you did not get to see me finish this work and graduate, but I know that you were watching and will continue to watch. I miss you so much every day. I miss your smile, your laugh, the words you spoke to me, the ear you used to listen to me, the shoulder you gave me on which to cry, and the loving way you looked at and treated Mom. Life will never be the same without your physical presence. However, in spirit, you remain as you always were - my inspiration and my hero. I will always strive to make you proud in all of my social, family, and professional endeavors. I love you so much it hurts, but I know that you will never leave me, that I will see you again, and that the time we had together will be a drop in the ocean relative to what is waiting for us.

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When applying to graduate schools in 2003, I was told that Texas A&M would be a good school to attend because, in addition to being one of the world's finest

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CHAPTER I

INTRODUCTION

Research Question and Contribution

The study of strategic alliances is an enduring theme in the organization sciences in general and in strategic management in particular. Strategic alliances are voluntary cooperative arrangements in which two or more firms share resources and adopt a governance structure to collaborate in the design and development, production, or marketing and distribution of goods and services (Das & Teng, 2000; Gulati, 1995; Zollo, Reuer, & Singh, 2002). Firms form alliances to gain access to tangible and intangible resources (Hitt, Dacin, Levitas, Arregle, & Borza, 2000; Oliver, 1990; Stuart, 1998). Because young firms (henceforth, referred to as *new ventures*) often have otherwise limited access to resources, alliances are critically important to these firms (Eisenhardt & Schoonhoven, 1996; Powell, Koput, & Smith-Doerr, 1996) and have been linked to performance advantages (Baum, Calabrese, & Silverman, 2000; Stuart, Hoang, & Hybels, 1999). However, as alliances nearly always involve an element of competition among the partners (Amburgey, Dacin, & Singh, 1996; Hamel, 1991; Zhang & Rajagopalan, 2002), new ventures are also especially vulnerable to many of the negative consequences sometimes associated with alliances. For example, such firms can become overly dependent on their partners, are more at risk of being exploited by larger partners, and have fewer resources to invest in the ongoing management of alliances (Alvarez & Barney, 2001; Khanna, Gulati, & Nohria, 1998; Miner, Amburgey, & Stearns, 1990).

This dissertation follows the style of *Academy of Management Journal*.

Alliances not only provide potential access to alliance partners' resources, but also signal firm quality to other resource providers (Podolny, 1994; Soh, Mahmood, & Mitchell, 2004), including prospective investors (Park & Mezias, 2005; Stuart et al., 1999). As signals, alliances convey information about the resources to which a firm has access, perhaps reducing uncertainty about the firm's performance prospects (Madhavan & Prescott, 1995; Ndofor & Levitas, 2004; Stuart, 2000). The argument that alliances are signals rests on research linking alliance formation announcements to stock market reactions (Chan, Kensinger, Keown, & Martin, 1997; Koh & Venkatraman, 1991; Woolridge & Snow, 1990). The underlying logic is that a new venture firm's potential to generate desirable returns for shareholders is difficult to discern (Certo, 2003; Higgins & Gulati, 2006), prompting interested investors to search for observable signals thought to covary with this potential (Spence, 1974; Stuart et al., 1999). Thus, from the signaling firm's perspective, the value of signals lies in the information they convey to outsiders and in the behavior they elicit from investors (Ang & Brau, 2003; Madhavan & Prescott, 1995). This information is also important to investors, as it reduces uncertainty and improves confidence in a firm's market performance prospects (Folta & Janney, 2004; Titman & Trueman, 1986).

Nevertheless, understanding that alliances are signals is not equivalent to understanding the information alliances signal to investors. Stated differently, firms send multiple signals simultaneously (Ang & Brau, 2003; Madhavan & Prescott, 1995) and the receivers of such signals consider them in concert to more accurately discern the information they convey (Folta & Janney, 2004; Heil & Robertson, 1991). In particular,

many factors may influence the information alliances signal to investors, particularly with respect to the resources they potentially make available to new ventures.

For instance, there is evidence from the IPO literature that the number of strategic alliances formed by new ventures has negligible effects on performance at initial public offering (IPO) (Gulati & Higgins, 2003; Higgins & Gulati, 2006). However, when partners are differentiated based on their tangible and intangible resources, scholars have found that new ventures get to IPO quicker and generate more capital at IPO when they maintain alliances with leading firms that have especially valuable resources (Chang, 2004; Stuart et al., 1999). In this sense, the resources of some alliance partners may provide signals that attract investors to these firms. In addition, scholars point out that both the types of alliances formed (i.e., marketing and technology) and the resources of alliance partners have important performance implications (Das & Teng, 2000; Stuart, 2000). In the biotechnology industry, for example, there is evidence that alliances targeting specific value chain activities stimulate new venture development (Calabrese, Baum, & Silverman, 2000; Walker, Kogut, & Shan, 1997), and the resources of alliance partners may be a key source of firm innovation (Baum et al., 2000; Powell et al., 1996). An extension of this reasoning suggests some resources may be more valuable in some types of alliances than others.

Despite this possibility, research on the stock market's reaction to alliances generally considers alliance type (Chan et al., 1997; Das, Sen, & Sengupta, 1998) and partner resources (Chang, 2004; Stuart et al., 1999) in relative isolation from the other. Moreover, research on investor responses to the resources available for new ventures to contribute to their alliances is virtually non-existent. This neglect is problematic because

a firm's current resources affect its attractiveness as an alliance partner (Colombo, Grilli, & Piva, 2006; Shan, Walker, & Kogut, 1994; Stuart, 1998) and its overall ability to benefit from alliances (Alvarez & Barney, 2001; Hamel, 1991; Khanna et al., 1998). In short, because research on market reaction to alliances generally incorporates one or a small number of such characteristics into a given study, our knowledge of the information alliances can signal to investors about a new venture's resources and earnings prospects is underdeveloped.

To more fully understand the signals alliances convey, we must move beyond studying alliance formation as a dichotomous event by incorporating (a) partner firm, (b) focal firm, and (c) alliance characteristics that influence the resources alliances make available (Park & Mezias, 2005; Stuart, 2000). I adopt this approach in the present study and propose the following research question: How and to what extent do specific partner firm, focal firm, and alliance characteristics provide signals to investors about the resources alliances make accessible to new ventures? To answer this question, my theory draws from and integrates insights from both signaling theory and resource-based theory on strategic alliances. The primary contribution lies in improving knowledge of investor reaction to a new venture's alliances by analyzing the resources these alliances can make available to the new venture and the potential signals about the firm's performance potential that such access conveys.

Empirical Setting

Firms having recently undertaken initial public offerings (IPOs) serve as the empirical setting for this research. An IPO transitions a firm from private to public ownership by offering tradable shares of the firm's stock to external investors for the

first time. Importantly, the IPO firms that are the focus of this study are young firms, as defined in prior literature on IPO firms (Carpenter, Pollock, & Leary, 2003; Certo, Covin, Daily, & Dalton, 2001). This setting is appropriate for at least three reasons.

First, as noted, strategic alliances are critically important to the success of new ventures, such as many IPO firms, which are often resource-constrained. Indeed, when alliances are announced, there is evidence that investors often react more positively for younger and smaller firms than for older and larger firms (Das et al., 1998; Koh & Venkatraman, 1991; Stuart, 2000). Furthermore, IPOs typically provide new ventures with an influx of financial capital (Florin, Lubatkin, & Schultz, 2003; Nelson, 2003) and may also increase legitimacy and social capital (Deeds, DeCarolis, & Coombs, 1997; Ravasi & Marchisio, 2003). Such resources may help firms attract new alliances (Ahuja, 2000a; Oliver, 1990). Thus, the transition from private to public entity may increase the options available for alliance formation in post-IPO new ventures.

Second, although the stock price of many IPO firms tends to rise on the first day of trading, they often underperform relative to the market in subsequent years (Certo, Holmes, & Holcomb, 2007; Ritter & Welch, 2002). One possible explanation is that IPOs fundamentally transform a firm, introducing new owners and other stakeholders, more stringent financial reporting and accountability, and altered organizational structures (Certo, 2003; Fischer & Pollock, 2004; Ibbotson & Ritter, 1995). Such disruptions in firm operations can create new uncertainties and challenges that can have negative effects of subsequent firm performance (Amburgey, Kelly, & Barnett, 1993; Hannan & Freeman, 1977; Singh, House, & Tucker, 1986). In post-IPO firms, for example, there is evidence that market to book ratios (MTB), price to earnings ratios

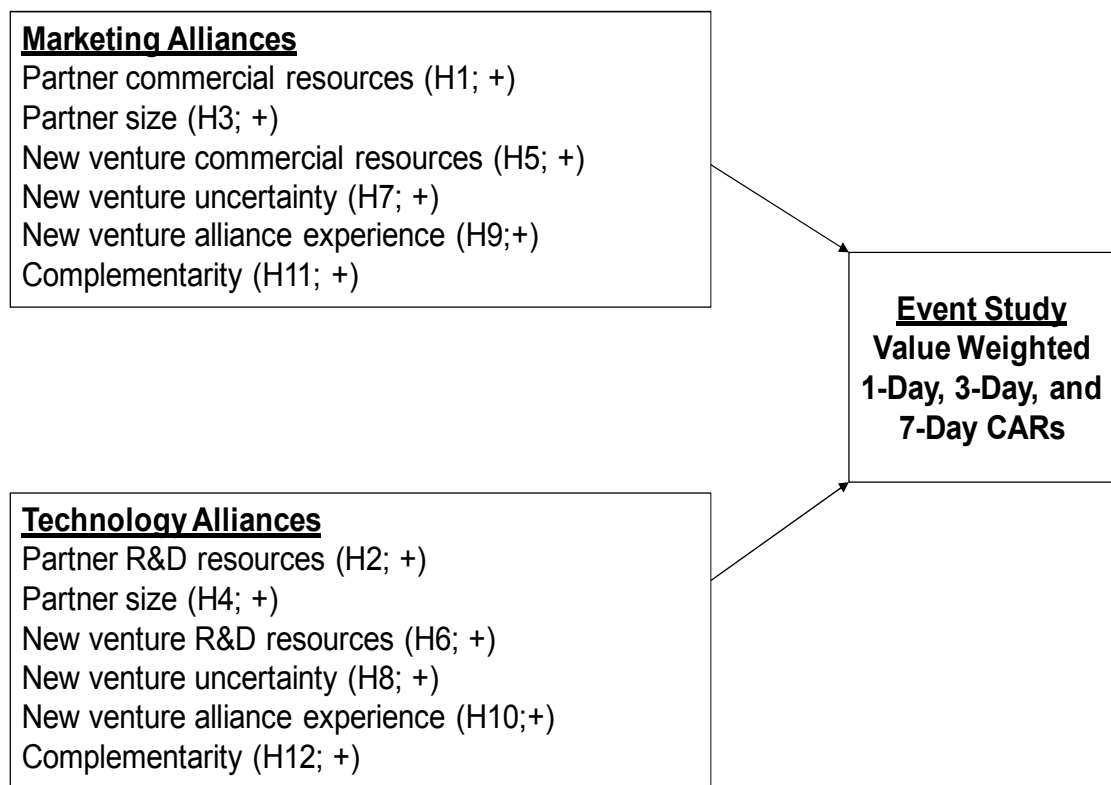
(PE), earnings per share (EPS) (Jain & Kini, 1994) may decline, and shareholder returns may be negative in the years following IPO (Florin, 2005). Also, some firms do not survive the transition (Fischer & Pollock, 2004; Teoh, Welch, & Wong, 1998). Thus, post-IPO firms may be motivated to seek out alliances to help navigate this transformation. Assessing investor responses to new venture alliance formation may improve our understanding of the resources and signals associated with this activity.

Third, as the above discussion implies, despite disclosure of information during the IPO, investors often remain highly uncertain about the futures of these firms. Their limited histories and previously private nature produce information asymmetry that makes it difficult for investors to value them (Beatty & Ritter, 1986; Higgins & Gulati, 2006). Investors are aware and perhaps wary of the risks associated with post-IPO new ventures (Carpenter et al., 2003; Mudambi & Treichel, 2005). The liquidity generated during the IPO (Ibbotson & Ritter, 1995) allows investors to react to announcements related to a new venture's strategy by trading the stock, thereby influencing the firm's market value. Thus, the importance of communicating strategy to market investors (Madhavan & Prescott 1995) is especially relevant in these firms. Because alliances can signal information about the resources to which a firm has access (Podolny, 1994; Stuart et al., 1999), investors are likely attuned to this aspect of a new venture's strategy.

This proposal proceeds as follows. The theory development chapter immediately follows. This chapter briefly describes the IPO process, introduces signaling theory and resource-based theory on alliances, and applies an integrative perspective to the present study. In this chapter, I also described the resources that specific alliance types and governance structures make available to new ventures and the potential signals such

access conveys. The third chapter contains specific hypotheses that codify the dissertation's theoretical arguments. These hypotheses are summarized in Figure 1. The methodological approach proposed to test these hypotheses is presented in the fourth chapter. The fifth chapter contains the results. In the sixth chapter, implications, limitations, and future research directions are discussed.

FIGURE 1
Hypothesized model



CHAPTER II

THEORY DEVELOPMENT

Initial Public Offerings

Extraordinary growth in initial public offering (IPO) activity and publicity during the 1990's accompanied a sharp rise in the study of IPO firms by strategic management scholars. IPO firms are important, both because of the economic activity they generate in the short-term and because they are likely to significantly influence future economic activity in the long-term. For example, according to Thompson Corporation data, 1,148 IPOs were completed from 1999 to 2003; the gross proceeds of these offerings totaled \$198 billion (PWC, 2004). Also, many of today's leading firms are public companies and therefore undertook an IPO at some point in their histories, further underscoring the importance of studying IPOs.

Recently, scholars have begun to complement earlier research on the short-term (i.e., first day) performance of IPO firms by extending the analysis to explain the long-term performance of such firms by studying them in the years following IPO. In particular, scholars have employed signaling theory (Janney & Folta, 2006) and resource-based theory (Wang & Ang, 2004) to explain post-IPO performance outcomes. Florin and his colleagues (2003) employed social capital theory to explain post-IPO performance, but their theory was only tangentially related to strategic alliances, their empirical analysis only used a count measure of alliances embedded in an index of other social capital variables, and their dependent variables were accounting measures. Thus, despite applicability of signaling theory and resource-based theory to post-IPO new ventures and strategic alliances, scholars have yet to use the approach presented herein

to study relationships among the alliances these firms form and their performance in the years following IPO.

The process of undergoing an initial public offering begins by registering with the Securities Exchange Commission (SEC) and drafting the IPO prospectus (Ellis, Michaely, & O'Hara, 2000). The prospectus is stringently regulated and provides detailed information about the firm (Certo et al., 2001); once filed, a firm cannot engage in activities to influence demand for its stock for approximately 25 days after the offering occurs (i.e., the quiet period, Krigman, Shaw, & Womack, 2001). During this time, managers can visit potential investors in a series of road shows to discuss the firm's operations, financials, products and services, future prospects, and so on (Certo, 2003). Information not included in the prospectus is prohibited from being discussed at these meetings (Pollock, Porac, & Wade, 2004). Many of these meetings involve institutional investors, who represent a large and influential group of owners (Aggarwal, Prabhala, & Puri, 2002). Depending on market conditions, investor demand, and preferences of other stakeholders, the offer price, the number of shares to be sold, and the date on which the offering will occur are determined. Once the offering begins, the shares of the formerly private firm's stock are sold to investors and the firm is henceforth a publicly-held entity with tradable shares.

Signaling Theory

Akerlof (1970) was one of the first to theoretically establish the existence of signals arguing that, without signals of product quality, product markets would not exist because customers would have little information with which to distinguish low quality from high quality products. Building on this idea, Spence (1973; 1974) articulated

signaling theory, arguing that signals are important sources of information when more objective information is unavailable. Subsequent work supports this idea, suggesting that signaling becomes more influential as uncertainty increases (Janney & Folta, 2006; Podolny, 1994; Stuart et al., 1999).

Spence (1973; 1974) originally presented the theory in the context of job search. He suggested that education serves as a signal of an applicant's future productivity (i.e., performance potential) and is therefore valued by prospective employers. Compared to higher quality applicants, lower quality applicants are likely to pursue less education because they find it more difficult, time consuming, and costly. Thus, the signal (education) conveys information that helps differentiate low quality applicants from high quality applicants. In providing such information, signals mitigate the potential for moral hazard and adverse selection (Folta & Janney, 2004; Janney & Folta, 2006). The reasoning has been extended to the firm level by Ross (1977), Milgrom and Roberts (1986), and Heil and Robertson (1991), among others. Generally, this body of work suggests that three conditions must hold for signals to be useful as a source of information.

First, the signal must be observable. Simply, signals must be observable if they are to provide information about unobservable qualities. Indeed, Madhavan and Prescott (1995) found evidence that alliances are less valuable signals to investors when industry conditions make the signals difficult to receive and interpret. Second, the costs of creating the signal must be inversely proportional to the unobserved qualities the firm is attempting to signal. For example, as noted by Folta and Janney (2004), issuing private equity tends to generate higher returns than issuing public equity because private equity

investors must be certified by the SEC, are thought to be better evaluators and monitors, and cannot sell their shares for up to two years. Because these investors have both the incentive and the ability to perform thorough due diligence, lower quality firms find it difficult or prohibitively expensive to issue private equity. Thus, issuing private equity sends a signal to other investors that the issuing firm is worthy of investment. Third, and similarly, the signal must be inimitable for lower quality firms. Titman and Trueman (1986) explicate this condition in the context of IPOs, arguing that attracting quality investment bankers and auditors sends positive signals to other investors about the firm's performance prospects because less promising firms are unlikely to attract such reputable parties to manage the offering.

When all of these conditions hold, the signal is credible and creates a separating equilibrium that differentiates low quality and high quality firms (Janney & Folta, 2006; Ndofor & Levitas, 2004; Spence, 1974). This separating equilibrium is maintained until feedback disconfirms the perceived correlation between the signal and the unobserved qualities of interest (Spence, 1974). When signals cannot differentiate firms, a pooling equilibrium exists and signals are ineffective sources of information (Spence, 2002). Interestingly, Brau and Fawcett (2006) report that top managers recognize the value of signaling at IPO, and they perceive that historical earnings and investment banker certification are key signals.

In studies of top management teams (TMTs), governance, and IPO firm performance, scholars have found evidence that investors evaluate multiple signals in conjunction (Certo et al., 2001; Certo, Daily, Cannella, & Dalton, 2003; Florin et al., 2003). According to signaling theory logic, signals are more valuable when there are

more of them, as the presence of many signals allows receivers to more accurately discern the information communicated (Lee, 2001). By evaluating many signals, receivers can compare and contrast the signals to identify consistent and inconsistent information, thereby improving interpretation (Folta & Janney, 2004; Heil & Robertson, 1991). Moreover, signaling through multiple actions raises the costs of signaling, enhancing credibility further (Lee, 2001; Williamson, 1983). In short, as noted by Milgrom and Roberts (1986), the value and credibility of the signals firms send to outsiders is enhanced by the presence of other signals that not only raise the costs of communicating the information, but also support and confirm it. Thus, it is important for signaling theory research to consider multiple signals simultaneously.

Finally, signals can convey negative information (Lee, 2001). For instance, signals that top managers are not receptive and open to new initiatives may prompt middle managers to withhold such proposals (Dutton, Ashford, O'Neill, Hayes, & Wierba, 1997). During IPO, top managers unloading their shares may signal potential agency problems that discourage investment in that firm (Ang & Brau, 2006). Similarly, the presence of founding CEOs may signal concentration of power in a firm's original owners, increasing information asymmetry and perhaps leading investment bankers to discount the firm's stock (Certo et al., 2001).

Resource-based Theory on Strategic Alliances

Because few firms have all of the resources necessary to compete, alliances are often used to gain access to the resources of other firms (Ireland, Hitt, & Vaidyanath, 2002). Given resource-constraints, this argument is especially relevant in the context of new ventures. Alliances are attractive because they are less expensive than other means

of accessing external resources (e.g., acquisitions), are somewhat reversible, and may therefore allow firms to access resources as they are needed and/or for limited periods of time (Holcomb, Holmes, & Hitt, 2006; Koh & Venkatraman, 1991). As such, the most attractive alliances are those that allow access to the needed resources (Gulati, 1995; Hitt et al., 2000). Additionally, there is evidence that the resources accessed through alliances can improve firm performance outcomes, perhaps by helping each partnering firm to more fully leverage its existing endowment (Khanna et al., 1998; Lavie, 2006) and/or by attracting other desirable partners (Kelley & Rice, 2002; Powell et al., 1996). In support, the commercial and technological resources of alliance partners have been linked to superior performance on the first day of public trading (Stuart et al., 1999).

Many applications of resource-based theory in the strategic alliance literature stress the importance of complementary resources. Complementary resources are different, yet mutually supportive (Hitt, Ireland, & Harrison, 2001a). The practice of combining strengths in marketing and distribution with externally accessed strengths in technology development is one example of potential complementarity (Harrison, Hitt, Ireland, & Hoskisson, 2001; Ireland et al., 2002). Another example is combining resources across market segments to generate and leverage broader and more unique products and service offerings that enhance competitiveness across segments (Cantwell, 2001; Chung, Singh, & Lee, 2000).

Complementary resources have the potential to generate greater profits collectively than either set of resources can separately (Amit & Schoemaker, 1993; Dyer & Singh, 1998). The value of complementarity is grounded in the argument that the market prices resources according to their current uses, making it difficult to profit by

purchasing resources and using them in well understood and anticipated ways (Barney, 1986; Lippman & Rumelt, 2003). Building complementarity involves combining resources to perform tasks that are unanticipated by the resource market, and generating such complementarity often requires accessing external resources (Denrell, Fang, & Winter, 2003; Sirmon, Hitt, & Ireland, 2007). Importantly, inter-partner differences in markets served and resource endowments have the highest possibility of producing complementarity. One reason may be that similarity preserves and perhaps enhances existing strengths, weaknesses, opportunities, and threats (Harrison, Hitt, Hoskisson, & Ireland, 1991; Hitt et al., 2001a). Conversely, accessing different but similar markets and resources creates new learning opportunities (Lavie & Rosenkopf, 2006; Zahra & George, 2002) and the potential to produce valuable, unique, and inimitable synergies (Gulati, 1995; Harrison et al., 2001).

Integrating Signaling Theory with Resource-based Theory on Strategic Alliances

A key insight of signaling theory research is that a new venture's relationships with high status stakeholders serve as endorsements of that firm. The argument that relationships signal endorsements is grounded in the idea that high status stakeholders avoid associations with lower quality firms because such allegiances potentially injure the superior reputations high status stakeholders have accumulated (Certo, 2003; Stuart et al., 1999). Although such reputation effects are one source of signal credibility, they are not the only source.

Signals also provide information about the resources to which firms have access. For instance, Turban and Greening (1997) note that corporate social responsibility investments enhance a firm's reputational resources and therefore improve its

attractiveness to potential employees. Signaling theory has also been used in competitive dynamics research to describe actions firms take to indicate commitment to a market, thereby discouraging rivals from attacking it. Specifically, by allocating significant resources to a given market, a firm signals a strong resource endowment relevant to that market and a willingness to protect such investments (Heil & Robertson, 1991; Hopkins, 2003; Kreps & Wilson, 1982). Finally, Lee (2001) argued that firms changing their names to more strongly identify with the Internet (e.g., adopting “dot com” names) attract resources specifically suited to electronic commerce, and such firms pursuing other activities consistent with that commitment produce valuable signals that enhance access to those resources in the future. In support, she found that investors respond positively to such name changes, and combining them with other strategies suggesting a commitment to the Internet resulted in greater positive responses from investors.

A central argument in the present work is that external relationships can provide signals about accessible resources. Extending Spence’s analysis beyond the evaluation of job applicant human capital, to the extent that acquiring education requires at least minimal interpersonal skills to interact with faculty, staff, and other students, a job applicant’s education can also provide information about his or her social capital. Moreover, the process of acquiring education can provide access to important social resources, such as contacts from other individuals associated with the focal institution, particularly if that institution is perceived to be prestigious (D’Aveni, 1990; Useem & Karabel, 1986). Therefore, from this perspective, signals provide information not only about human capital, but also about social capital (Certo, 2003; Higgins & Gulati, 2006).

By affiliation, firms can sometimes benefit from the reputation and legitimacy of other firms (Baum & Oliver, 1992; Oliver, 1990). For new ventures, drawing on other firms for these resources can be valuable because, although important, they can be otherwise difficult to develop (Aldrich & Fiol, 1994; Certo, 2003; Zimmerman & Zeitz, 2002). Social affiliation with high status alliance partners may be especially valuable, as these firms are thought to be more selective and accurate in their evaluations of other firms and also have more partnering options at their disposal (Janney & Folta, 2006; Stuart, 2000). In a study of new venture firms, Reuber and Fischer (2003) support this argument, finding evidence that such firms seek out high status customers to signal an ability to serve demanding clients. The signal appears credible because the performance of these customers depends to some degree on the products and services provided by the new ventures. Since firm exits can hurt the performance of partners (Uzzi, 1997; in extreme cases, the survival partners are threatened when partners fail; Singh & Mitchell, 1996), alliance formation can be a credible signal that at least one partner has confidence in the value-creating potential of the new venture's resources. Thus, the ability to maintain stable trading relations may be a signal of a new venture's competence. Similarly, Cook (1999) argues that trade credit (short-term accounts payable) can signal that other firms have confidence that an entrepreneurial firm has the financial resources to repay its liabilities. Because the two firms' short-term performance outcomes are linked by such arrangements, the relationship serves as a signal of a new venture's credit-worthiness, enhancing the firm's access to more substantial bank loans.

In further support, Davilla, Foster, and Gupta (2003) argued that venture capital investment provides a signal that the receiving firm has strong technological, financial,

and managerial resources, thereby enhancing the firm's appeal to potential employees. Other work suggests that the prior work affiliations of an IPO firm's TMT members and the prestige of its board members can signal competence and the potential to access valuable external resources (Certo, 2003; Higgins & Gulati, 2006). Finally, as noted, Stuart and his colleagues (1999) found evidence that the commercial and technological resources of alliance partners provide signals that help firms go public faster and generate higher valuations at IPO.

Strategic Alliances as Potential Signals to Investors

Strategic alliances can serve as signals to investors about the resources to which new venture firms have access. First, alliances are observable. As noted, many studies have linked announcements of strategic alliance formation to changes in firm stock price, suggesting that investors observe and are attuned to firms' alliances. Strategic alliances are also reported in various media, including newspapers and other periodicals, academic and investor databases, and public relations announcements. The second and third requirements are that the costs of the signal (i.e., alliance) must be inversely correlated with the firm's performance potential and that the signal must be difficult for inferior firms to imitate. Generally, alliance formation may be less costly and more imitable than other strategic actions (Holcomb et al., 2006; Inkpen, 2001), but alliances with prominent organizations are much less so. Again, the logic is that such alliances are more costly and less imitable than other alliances because prominent organizations are presumed to be more selective and reliable in partner selection evaluations and probably have more alternatives with which to partner. Because the commercial and technological resources of alliance partners are vital for many new venture firms, these resources

indicate the prominence of a given partner (Folta & Janney, 2004; Stuart et al., 1999). Similarly, larger firms and those covered intensely by the media are thought to be leading firms that make desirable partners for new ventures (Chang, 2004; Stuart, 2000). Moreover, investors using a new venture's strategic alliances to infer its performance potential may also consider the types of alliances it forms, its existing resource endowment (Das et al., 1998; Park, Mezas, & Song, 2004), and other characteristics, such as its size and current markets (Chan et al., 1997; Park & Mezas, 2005).

Prior research employing event study methodology indicates that investors use information about a firm's alliances to adjust expectations about its performance potential, as evidenced by changes in cumulative abnormal returns (CARs) upon the announcement of alliances. This approach is also employed in the present study. Event study methodology is intended to capture market reaction to an announced event that was previously unexpected (McWilliams & Siegel, 1997). The extent to which security prices change upon announcement of the unexpected event reflects its magnitude, as perceived by investors (Brown & Warner, 1980). Typically, the change is evaluated relative to the given security's historical performance, and differences are referred to as abnormal returns (MacKinlay, 1997). It follows that positive and negative stock price movements imply positive and negative investor reactions, respectively, to the information conveyed by the announcement (Lee, 2001).

Research on the short-term performance of IPO firms typically terminates the analysis after the first day of trading. Traditional finance and economic theory suggests that investor reaction to signals is captured in the returns generated at IPO. Common dependent variables include underpricing (the difference between the stock's closing and

opening prices on the first day of trading; Certo et al., 2001; Cohen & Dean, 2005), net proceeds raised at IPO (the financial resources retained by the IPO firm, less costs incurred during the offering; Florin et al., 2003; Gulati & Higgins, 2003), and the percent price premium at IPO (the price at which the firm's stock goes on sale to investors at the beginning of the first day of trading less book value, with this difference divided by the offer price; Certo et al., 2003; Nelson, 2003). These dependent variables are the outcome of a price-setting process involving institutional investors, prominent individual investors, underwriters, the IPO firm, and other stakeholders (Aggarwal & Conroy, 2000; Certo et al., 2003; Pollock et al., 2004). The evaluative process is lengthy and includes extensive analysis of the IPO firm's performance prospects, as evidenced by its management, strategy, structure, governance characteristics, and so on (Certo, 2003; Titman & Trueman, 1986; Welbourne & Andrews, 1996).

Using event study methodology to examine accumulated investor reaction during such a long time period is not advisable, as this approach increases the possibility that extraneous factors (e.g., dividend changes, earnings announcements, etc.) confound the link between the announcement of interest and the market's response (Bromiley, Govekar, & Marcus, 1988). Conversely, if CARs are constructed to reflect short-term market reaction to an alliance announcement, they can be interpreted as the market's collective estimation of the marginal value associated with that alliance. Thus, although related, CARs has different generative mechanisms and is a fundamentally different dependent variable than measures targeting short-term performance at IPO. Accordingly, research results on such short-term market performance, though valuable, cannot be assumed to generalize to market performance following IPO.

Strategic Alliance Types as Signals of Accessible Resources

Drawing on signaling theory and resource-based theory on alliances, this work examines investor reaction to different types of alliances by segmenting them into those associated primarily with marketing activities and those associated primarily with technology development (Park & Mezas, 2005). Building on the argument that investors, including those evaluating firms undergoing or having recently undergone an IPO, consider multiple signals to assess firm quality (Ang & Brau, 2003; Folta & Janney, 2004; Madhavan & Prescott, 1995), the effects of alliance types and partner characteristics are considered in combination. In particular, as noted, the analysis includes new venture firm and partner firm characteristics that influence the resources certain alliances make available, potentially providing insight into the impact of a new venture's alliances as signals of accessible resources.

To study alliance types, strategic management scholars are increasingly drawing on Porter's (1985) concept of the value chain. A stimulant to this approach is research suggesting that new ventures forming alliances targeting specific primary value chain activities (primary activities directly create value and include marketing and research and development activities, whereas secondary activities are those involving support services such as human resources and finance; Porter, 1991) can access resources from alliance partners that improve performance (Baum et al., 2000; Li & Atuahene-Gima, 2002). The terminology used to refer to different types of alliances is inconsistent, but distinguishing alliances based on whether they perform downstream value chain activities or upstream value chain activities is fairly consistent from study to study. Henceforth, I use terminology consistent with that employed by Das and colleagues

(1998) and Park and Mezias (2005), referring to alliances that perform downstream activities as marketing alliances and alliances that perform upstream activities as technology alliances. In doing so, this dissertation responds to the call for more research incorporating this distinction into the study of IPO firms (Gulati & Higgins, 2003).

Marketing alliances are primarily concerned with stimulating customer demand through downstream value chain activities involving functions such as sales, distribution, and customer service (Das et al., 1998). In e-commerce firms, for example, specific activities include sharing sales forces, cross-selling, joint advertisement and co-promotion, cooperation in the distribution of goods and services, and common customer loyalty programs (Evans & Wurster, 1999; Park et al., 2004). Rothaermel and Deeds (2006) use the term *downstream alliances*, noting that such alliances may also be used to confront regulatory obstacles in biotechnology. Hagedoorn (1993) suggests that these alliances are motivated by *market access*, which includes activities associated with monitoring the environment to search for and enter new product and geographic markets. Referring to *exploitation alliances*, Rothaermel (2001) argues that these alliances are associated with commercializing new products and services to exploit existing sources of competitive advantage. Interaction between the partners in a marketing alliance often involves the sharing of knowledge associated with sales figures, customer demand, forward supply chain conditions, and so on. Although some of this knowledge may be tacit, much of it is explicit and codifiable, reducing the difficulty of transferring it between the partners (Rothaermel & Deeds, 2006; Zander & Kogut, 1995).

Technology alliances are concerned with developing new products and services and include research and development (R&D), engineering, and technology transfer

activities (Das et al., 1998). Referring to such alliances as *exploration alliances*, Rothaermel (2001) similarly notes that they can involve research, design, and discovery of novel products and services. According to Hagedoorn (1993), technology alliances are often intended to help firms cope with shortening technology life cycles by providing increased access to new technologies and reducing the costs and risks of basic and/or applied research. Indeed, Ahuja (2000b) found evidence that technology alliances in the chemicals industry provide technical knowledge that help firms improve their innovation efforts. Often, an additional purpose is combining multiple technologies, perhaps from different industries, to create more advanced products and services (Cantwell, 2001; Hagedoorn, 1993). However, technology investments may take a long time to materialize, can create uncertainty, and may increase the information asymmetry between firms and investors (Heeley, Matusik, & Jain, 2007; Hoskisson, Hitt, Johnson, & Grossman, 2002; Pisano, 1990). Exchanged knowledge, whether based on new applications of existing technology or on entirely new technology, may be highly tacit and difficult to transfer (Park et al., 2004; Teece, 1986). Interpersonal interaction and new or adapted knowledge sharing routines may be necessary, and these processes can be expensive, time consuming, and demanding (Lavie, 2006; Teece, 1986). Thus, in general, technology alliances may be somewhat more challenging to manage than are marketing alliances (Larson, 1992; Rothaermel & Deeds, 2006). In addition, the potential to fail in technology alliances is high, and many never produce the intended benefits (Das & Teng, 1996; Park & Mezias, 2005; Ring & Van de Ven, 1992).

Importantly, research using event study methodology suggests that stock market investors recognize and differentiate among the possible signals conveyed by these two

types of alliances. For instance, two studies by Park and his colleagues (Park et al., 2004; Park & Mezias, 2005) found that investors typically respond more favorably to marketing alliances than to technology alliances. In contrast, Das and colleagues (1998) and Chan and colleagues (1997) found evidence that investors respond more favorably to technology alliances than to marketing alliances. Thus, although evidence is mixed as to which alliance type is preferred by investors, that each study found differences in investor reaction suggests that investors do recognize the distinction between the benefits provided by marketing and technology alliances.

This study will extend research on stock market reactions to marketing and technology alliances. Prior work incorporating factors that condition the value of these two types of alliances is limited. One example was reported by Park and Mezias (2004), who found that marketing alliances were more valuable as environmental munificence decreases. In a second example, Das et al. (1998) found that a firm's profitability negatively affected the value of marketing alliances and that the relative difference in size among partners negatively affected the value of technology alliances. In the present research, additional theoretically important alliance, new venture firm, and partner firm variables are included.

CHAPTER III

HYPOTHESES

Alliance Partner Characteristics

Building on the idea that selecting appropriate partners is often critical to alliance success (Hitt et al., 2000; Holcomb et al., 2006; Ireland et al., 2002), signaling theorists have found evidence that the information signaled by alliance formation depends to some extent on characteristics of the new venture's partners (Chang, 2004; Park & Mezas, 2005). Signal receivers, including investors, interpret multiple signals by distinguishing among them and comparing the information they contain (Ang & Brau, 2003; Spence, 1973). Consistency in signals helps establish credibility (Heil & Robertson, 1991; Lee, 2001). As such, investors analyzing a new venture's alliances may also evaluate characteristics of its partners to better ascertain the information that such alliances convey. In this section, I present hypotheses relating the commercial and R&D resources of partners to the market performance experienced by new ventures upon the announcement of marketing and technology alliances, respectively. Commercial resources are those facilitating access to customers, distribution, and the ability to leverage product and service offerings profitably in customer markets. R&D resources are those associated with developing, designing, or otherwise creating new and innovative product and service offerings.

Partners are heterogeneous with respect to the resources they control. Partners with strong commercial and technological resources are typically visible and prestigious firms (Stuart et al., 1999). Signaling theory suggests that affiliation with well-known firms provides a positive signal about the resources and performance potential of less

prominent firms (Reuber & Fischer, 2005). Because established firms allocating a significant portion of their financial resources to a given set of activities are more likely to be considered experts and leaders in such activities, investors may perceive that alliances with commercial and technological leaders allow new ventures to tap the superior resources and valuable experiences of these firms (Stuart, 2000). Further, partners can provide intangible resources, such as reputation and legitimacy, to less established organizations (Hitt et al., 2000; Oliver, 1990). Leading firms are thought to be less likely to partner with inferior firms, thereby providing a positive signal of a new venture's prospects (Ndofor & Levitas, 2004). As such, from a signaling perspective, consistency among a new venture's alliance activities and the resource characteristics of its partners should provide valuable signals to investors. From a resource-based perspective, new ventures frequently search for alliance partners with valuable resources specialized to immediate needs (Doh, 2000). Not all resources are equally valuable, and alliances allowing partners to take advantage of their existing resource strengths should be more valuable (Ireland et al., 2002). In this sense, alliances with partners allocating significant financial resources in related areas suggest a higher likelihood of success (Lavie, 2006).

Marketing Alliances and Partners' Commercial Resources. In discussing partners' commercial resources, marketing alliances, and short-term market returns, it is important to emphasize that firm performance depends not only on the ability to develop new product and service ideas, but also on the ability to commercialize them (Ahuja & Lampert, 2001; Rothaermel, 2001). Establishing customer bases by adeptly commercializing products and services is particularly vital for new ventures, but their

resource constraints hinder such efforts. By allowing new ventures to draw on the resources of other firms, marketing alliances are a way to address such challenges, especially when partners are especially strong in commercial activities. To investors, marketing alliances with commercially prominent partners may signal that new venture firms have promising opportunities to access new markets and customers (Park & Mezas, 2005; Stuart, 2000).

Commercially prominent partners may have greater access to distribution channels and are more likely than other partners to have long standing relationships with superior customers (Stuart, 2000). Marketing alliances provide opportunities and incentives for partners to jointly collect and exchange information on customer demand. Such increased customer access and interaction can help new ventures improve their marketing efforts, perhaps by customizing existing product and service offerings and improving sales approaches to achieve greater penetration of both new and existing markets (Park et al., 2004). For instance, when a new venture's alliance partners have especially valuable commercial resources, cooperating in activities such as sales, advertisement, and promotion (Das et al., 1998) helps new ventures draw from their partners' reputation and legitimacy (Oliver, 1990) to attract new customers. Commercially prominent partners may also have strong brand names, and new ventures are sometimes able to benefit from such resources (Evans & Wurster, 1999). Thus, marketing alliances with commercially prominent partners may help reduce investor uncertainty regarding a recently public firm's future earnings by signaling access to resources that can help the firm achieve successful commercialization of its product and service offerings.

Hypothesis 1: The commercial resources of a new venture's alliance partner are positively related to the new venture's cumulative abnormal returns upon the announcement of a marketing alliance with that partner.

Technology Alliances and Partners' R&D Resources. The positive signals conveyed by technology alliances rest on the notion that all firms, particularly entrepreneurial firms, must be capable of learning and innovating to succeed in the modern economy (Franko, 1989; Hitt Ireland, Camp, & Sexton, 2001b; Sarkar, Echambadi, Agarwal, & Sen, 2006). Through technology alliances, firms can monitor technological advances and access the technology of partners through the design and development of products and services (Chan et al., 1997; Hagedoorn, 1993; Rothaermel, 2001). In addition, reducing the costs and risks of R&D investment by sharing these activities in technology alliances (Hagedoorn, 1993) can be especially valuable to new ventures that often lack the necessary resources to engage in large scale R&D unilaterally. Technologically prominent partners likely have advanced and innovative resources from which the new venture can draw. Allying with such firms may therefore provide an especially valuable signal to investors about a new venture's potential to develop novel products and services. In support, there is evidence that investors respond favorably to the technological resources of alliance partners on the first day of trading (Stuart et al., 1999).

Technologically advanced partners signal greater potential to capitalize on innovation opportunities (Stuart, 2000). Accessing especially valuable technical resources creates learning opportunities, which can enhance a new venture's innovativeness in activities independent and subsequent to a focal alliance (Baum et al., 2000; Kelley & Rice, 2002; Stuart, 2000). For instance, Stuart (2000) found that the

technological resources of alliance partners improved the innovativeness of semiconductor firms, and studies by Ahuja (2000b) and Rothaermel (2001) report similar results in the telecommunications industry and biotechnology industry, respectively. These results suggest that high technology firms can use their partners' technologies to enhance the value of their own technologies. Such innovations, in turn, have been linked to superior firm performance (Wuyts, Dutta, & Stremersch, 2004).

Hypothesis 2: The R&D resources of a new venture's alliance partner are positively related to the new venture's cumulative abnormal returns upon the announcement of a technology alliance with that partner.

Literature suggests that the benefits potential investors perceive in alliance formation depend in part on the size of the partnering firms (Das et al., 1998). The next two hypotheses pertain to this argument.

Pre-alliance partner selection processes can be extensive, involving assessment of potential partners' financial, managerial, and technological resources, market positions, alliance history, and so on (Hitt et al., 2000; Holcomb et al., 2006; Stuart, 1998). These analyses provide opportunities for managers of the respective firms to meet with one another (Bamford, Ernst, & Fubini, 2004), which suggests that in depth evaluation is possible and occurs in many situations. This evaluation is important, given that the performance of partnering firms may become interdependent to some degree (Singh & Mitchell, 1996; Uzzi, 1997). Because large firms are thought to be superior evaluators with more partnering options at their disposal (Ndofor & Levitas, 2004; Stuart, 2000), an alliance with such a firm may be a positive signal of the new venture's performance prospects. Indeed, extending the argument that highly legitimate top managers and board directors avoid investing their human capital in firms with poor

performance prospects (Certo, 2003; Cohen & Dean, 2005), large and prominent alliance partners are also likely to avoid partnering with such firms.

Marketing Alliances with Large Partners. Marketing alliances with large and established partners may be an especially valuable signal for new ventures. For reasons similar to those underlying the positive signals associated with attracting high status customers (Reuber & Fischer, 2005), a marketing alliance with a well-established organization may signal that a new venture is capable of reliably engaging in large-scale marketing activities across a sizable customer base. Moreover, large organizations are often the most visible and legitimate players in the environment (DiMaggio & Powell, 1983; Haveman, 1993). Thus, participating in a marketing alliance with a leading organization may give credibility to the new venture's marketing efforts, perhaps attracting future customers and investors.

Moreover, investors in new ventures may be specifically concerned with their ability to generate income (Florin, 2005). Thus, they often value marketing alliances that provide increased access to revenue streams in the short-term (Park & Mezas, 2005). Partnering with large firms helps provide a new venture access to sizable and relatively stable revenue streams on which it can attempt to grow its own sales base (Stuart, 2000). When such firms have access to additional resources to facilitate cash-generating exploitation of product and service offerings, investors may respond favorably as concerns about cash flows are alleviated (Srivastava, Shervani, & Fahey, 1998). Since large firms are presumed to have access to more of such resources, marketing alliances with these firms may be a positive signal of a new venture's future earning potential.

Hypothesis 3: The size of a new venture's alliance partner is positively related to the new venture's cumulative abnormal returns upon the announcement of a marketing alliance with that firm.

Technology Alliances with Large Partners. As noted, the returns to technology investments often take a long time to materialize and there may be uncertainty regarding whether or not they will eventually do so (Hoskisson et al., 2002; Pisano, 1990). Thus, although innovative activities are vital to the success of new ventures in high technology industries, these activities also create information asymmetries between the firm and external stakeholders (Coff, 2003). Indeed, at IPO, investors sometimes discount the stocks of firms with strategies heavily dependent on research and development, especially when there are concerns about the ability to appropriate the value created through such activities (Heeley et al., 2007). Moreover, Hagedoorn and Schakenraad (1994) argued that entrepreneurial firms often have inadequate resources to realize the full performance potential of these alliances. From this perspective, technology alliances may sometimes add to investor uncertainty because of the need for autonomous organizations to cooperate in an already ambiguous set of activities involving products and services that may be far from commercialization (Das & Teng, 1998; Folta & Janney, 2004; Rothaermel, 2001).

Partnering with large firms may help address investor concerns about a new venture's technological activities and performance prospects. The visibility, status, reputation, and history of leading firms may be an information source that allows outsiders to accurately gauge these firms' behaviors and resources (DiMaggio & Powell, 1983; Haunschild & Miner, 1997). Typically, there is more publicity associated with the actions of large firms, enhancing the quality and strength of communicated signals, as

the link between them and firm reputations is more explicit (Heil & Robertson, 1991; Ross, 1977). Forming an alliance with a large and established partner communicates that at least one firm has evaluated and is comfortable with the new venture's innovative potential. Finally, the well-developed revenue streams and customers bases of large and established firms (Stuart, 2000) may provide both the incentive and the ability for the partners to succeed through innovation (Hitt, Hoskisson, & Kim, 1997). Accordingly, by alleviating some of the information asymmetry associated with technology alliances, the presence of a large partner may improve investor reactions to them.

Hypothesis 4: The size of a new venture's alliance partner is positively related to the new venture's cumulative abnormal returns upon the announcement of a technology alliance with that firm.

New Venture Characteristics

Investor reactions to the information signaled by a new venture's alliances may depend on more than the characteristics of its alliance partner. In this section, new venture characteristics that may influence the signals conveyed by its alliances are examined.

As noted, signaling theorists argue that multiple signals communicating consistent information help reinforce one another, potentially increasing the cost of signaling and improving investor confidence in the reliability of the signaled information (Folta & Janney, 2004; Heil & Robertson, 1991). Signaling through controllable actions, such as financial resource allocation and alliance formation, also makes the signals more observable and tangible, improving the receiver's ability to accurately gauge the signaler's intentions and priorities (Heil & Robertson, 1991; Lee, 2001). Thus, new

ventures may have an interest in sending additional signals to complement or otherwise enhance the quality of the information conveyed through alliance formation.

A new venture allocating its scarce resources to independently perform activities similar to those performed in its alliances may provide strong signals to investors. Such spending suggests an opportunity to build at least a basic understanding of those activities shared with partners, enhancing the likelihood that learning will occur (Lane & Lubatkin, 1998). Such learning helps the focal firm access the resources of its partner, perhaps improving the value created by the given alliance (Dyer & Singh, 1998). In addition, learning creates opportunities to leverage the resources provided by alliances in other endeavors and may therefore facilitate subsequent improvements in firm performance (Khanna et al., 1998). Investing a firm's limited resources in activities similar to those jointly performed with alliance partners also signals management priorities, enabling better mobilization and coordination of internal and alliance-related efforts associated with those priorities (Aldrich & Fiol, 1994; Pfeffer, 1981). Similarly, investors may perceive that alliances targeting specific areas in which the focal firm has strengths are more likely to generate benefits associated with relatedness, such as market power and efficiency, and therefore respond by valuing such alliances higher in the market (Koh & Venkatraman, 1991; Merchant & Schendel, 2000).

Marketing Alliances and New Ventures' Commercial Resources. There is evidence that investors respond positively to increases in the commercial resource investments made by new ventures, perhaps because such investments accumulate and signal that the firm is leveraging prior investments by building on them (Kor & Mahoney, 2005). Stated differently, significant resource allocations to marketing activities may improve investor

confidence in the performance potential of future commitments in marketing, especially when such investments create the potential to access new resources in this area. Moreover, heavy investment in commercial resources signals strength in downstream value chain activities, potentially improving marketing alliance partnering options and the likelihood that valuable synergies will materialize. Conversely, firms with weak commercial resource endowments may have difficulty attracting partners in high technology industries (Ahuja, 2000a).

In addition, effective learning is more likely in areas close to a firm's existing strengths (Levinthal & March, 1993), so a new venture's strength in commercial resources potentially increases the likelihood of learning from a marketing alliance. Acquired knowledge resources can be combined with the firm's existing commercial strengths to pursue new opportunities. Also, a new venture with stronger commercial resource endowments may be capable of contributing more to its marketing alliances than can a new venture with weaker commercial resources, potentially improving the former's ability to appropriate an equitable share of the value created (Alvarez & Barney, 2001; Hamel, 1991). In support of these arguments, research suggests that marketing alliances are positively related to post-IPO sales growth for firms with strategies dependent on marketing (McGee, Dowling, & Megginson, 1995).

Hypothesis 5: The commercial resources of a new venture firm are positively related to the new venture's cumulative abnormal returns upon the announcement of a marketing alliance.

Technology Alliances and New Ventures' R&D Resources. Related logic suggests that the R&D resources of a new venture firm's alliance partners may affect the returns it generates from the announcement of technology alliances. Firms with more innovation-

oriented strategies tend to form more technology alliances (Eisenhardt & Schoonhoven, 1996; Hagedoorn & Schakenraad, 1994). One reason is that such investments improve partnering options by signaling innovative potential (Shan et al., 1994; Stuart, 1998). Technologically competent firms are also in a better position to use the resources accessed through technology alliances to enhance the productivity of other R&D activities not directly related to such alliances (Powell et al., 1996).

Nonetheless, learning through these alliances is usually difficult because technologies are often highly tacit, making them difficult to transfer without close interaction (Chen & Holmes, 2006; Teece, 1986). However, when new ventures already have strong technological resources, they may have the absorptive capacity necessary to learn from future investments in technology (Cohen & Levinthal, 1990), including technology alliances (Bayona, Garcia-Marco, & Huerta, 2001). Accessing such knowledge from alliance partners may enhance a firm's ability to learn and innovate in future endeavors, but an inability to learn can sacrifice such opportunities (Lane & Lubatkin, 1998; Zahra & George, 2002). These deficiencies can in turn reduce a new venture's future competitiveness (Zahra, Ireland, & Hitt, 2000).

Moreover, as noted, technology alliances provide a new venture with opportunities to access its partners' innovative capabilities and also serve as a signal to investors that it is involved in actions to improve its technological competence. As such, benefiting from technology alliances requires investing sufficient resources to support these alliances and give them a meaningful chance of success (Bayona et al., 2001; Hagedoorn & Schakenraad, 1994). The extent to which a new venture can remain valuable to its partners by repeatedly contributing valuable technology to the alliance

also helps the firm appropriate the profits generated if the alliance succeeds (Alvarez & Barney, 2001). In support, there is evidence that new ventures demonstrating quality technology resources attract more technology alliance partners and subsequently become more innovative (Kelley & Rice, 2002; Mowery, Oxley, & Silverman, 1998). Thus, there are several reasons to expect a positive relationship between a new venture's R&D resources and investor responses to an announced technology alliance.

Hypothesis 6: The R&D resources of a new venture firm are positively related to the new venture's cumulative abnormal returns upon the announcement of a technology alliance.

Signaling is more valuable to both the sender and the receiver when a relative lack of objective information creates uncertainty and information asymmetry (Lee, 2001; Spence, 1973). As noted, the previously private and short histories of new ventures deprive investors of objective information, producing uncertainty and information asymmetry (Certo, 2003; Folta & Janney, 2004). This problem is more acute in smaller and younger firms, enhancing the importance of signals as a source of information on such firms (Podolny, 1994; Stuart, 2000). Although IPO firms may generate visibility and media attention (Pollok, Rindova, & Maggitti, 2008; Ravasi & Marchisio 2003), the entrepreneurial nature of many such firms limits opportunities for media exposure. Further, though important, disclosed financial statements provide an incomplete picture of a new venture's resources, prompting investors to search for signals conveying such information.

Small and young new ventures are typically associated with more uncertainty than their larger and older counterparts (Folta & Janney, 2004; Sanders & Boivie, 2004). Their external relationships are important because investors otherwise have difficulty

evaluating them (Certo, 2003; Stuart et al., 1999). Further, their size and age increases their susceptibility to failure, increasing the importance of external relationships further (Baum & Oliver, 1992; Gulati & Higgins, 2003).

Marketing Alliances and New Venture Uncertainty. Because of their limited assets, small new ventures may have difficulty establishing and maintaining stable customer bases. Young new ventures may have a similar problem because they have had less time to develop such bases. Marketing alliances can be especially valuable to these types of firms. Indeed, given the challenges small and young firms confront in the marketplace, the customers, distribution channels, and marketing-related knowledge potentially accessed through a marketing alliance (Das et al., 1998; Hagedoorn, 1993) may have a significant marginal impact on the competitiveness of these firms. Stated differently, relative to other firms, the marginal benefit of marketing alliances for small or young firms may be higher. In this sense, to the extent that investors are uncertain about the ability of new and young firms to generate income (Florin, 2005), accessing new markets and potential customers through a marketing alliance may be a valuable signal.

Marketing alliances have other features that might be beneficial for small and young firms. Much of the knowledge exchanged in marketing alliances is less complex and tacit than is the knowledge exchanged in technology alliances (Park et al., 2004; Rothaermel & Deeds, 2006). Information on market size, share, and trends may be directly codifiable. Sales and distribution activities may also be more routine-oriented and explicit than technical knowledge (Hagedoorn, 1993; Rothaermel, 2001, easing transfer (Teece, 1986; Zander & Kogut, 1995), and perhaps reducing the complexity of operating marketing alliances (Larson, 1992). For similar reasons, the benefits of these

alliances can often be realized rather quickly (Rothaermel, 2001). Similarly, because the performance of alliance partners is interdependent to some degree (Singh & Mitchell, 1996; Uzzi, 1997), forming a marketing alliance suggests that another firm has confidence in the small or young firm's marketing activities and performance potential.

Hypothesis 7: The uncertainty associated with a new venture firm is positively related to the new venture's cumulative abnormal returns upon the announcement of a marketing alliance.

Technology Alliances and New Venture Uncertainty. As with customer bases and revenue streams, small and young firms may have difficulty building their technology portfolios and pipelines. The limited resources of small firms, coupled with the high costs of internal R&D and acquiring technology externally, can dampen opportunities for technological development. Also, establishing and having other firms accept a new venture's technology can be time consuming and challenging, and younger firms have had a shorter horizon to do so. Thus, in a manner similar to that discussed above with marketing alliances, any accessed technologies, knowledge, and development opportunities (Das et al., 1998; Hagedoorn, 1993) may have a larger impact on the technical resources available to smaller and younger firms, relative to their larger and older counterparts. Accordingly, the uncertainty associated with the technologies of many small and young firms (Heeley et al., 2007) may lead investors to place greater weight on the signals associated with a technology alliance.

Moreover, although the technological development of many small and young firms may limit the benefits they receive from technology alliances (Hagedoorn and Schakenraad, 1994), it is important to emphasize that such firms also have many advantages pertaining to such alliances. For instance, the informal and flexible

communications systems and performance incentives frequently found in small firms may help them attract technically competent R&D personnel (Alvarez & Barney, 2001). In addition, these characteristics of small and young new ventures may also increase their ability to absorb, distribute, and integrate technical knowledge within the firm, perhaps providing them a learning advantage (Autio, Sapienza, & Almeida, 2000; Zahra, 2005). Thus, despite the challenges that small and young firms confront, investors might also view technology alliances as promising opportunities to improve the firm's technological position. In support, there is evidence that the smaller partner in technology alliances benefits more than does the larger partner (Das et al., 1998).

Hypothesis 8: The uncertainty associated with a new venture firm is positively related to the new venture's cumulative abnormal returns upon the announcement of a technology alliance.

The next two hypotheses relate the alliance experience of new ventures with the cumulative abnormal returns associated with the announcements of marketing and technology alliances. Alliance experience is accumulated over time as firms engage with other firms in prior partnerships. Consistent with the argument that experience provides opportunities to learn to send better signals (Folta & Janney, 2004), Anand and Khanna (2000) found evidence that managers can utilize prior alliances to learn to create greater stock market value in subsequent alliances. Engaging in many alliances over time also creates some consistency and irreversibility in the activity, enhancing signal credibility (Heil & Robertson, 1991; Lee, 2001). Similarly, multiple prior alliance relationships may provide a useful signal about the performance potential of subsequent alliances.

Marketing Alliances and Alliance Experience. Alliance experience may enhance the market's response to the announcement of a marketing alliance. Managing alliances is

challenging (Ireland et al., 2002), especially for resource-constrained new ventures (Li & Atuahene-Gima, 2002). In particular, marketing alliances represent a vehicle for quickly leveraging existing resource and capability advantages in current or new markets (Das et al., 1998; Rothaermel, 2001). When market conditions change, partners must be able to quickly and effectively respond to maintain or enhance their positions (Lee & Grewal, 2004). Therefore, inter-partner cooperation, speed, and flexibility are important. New ventures with significant alliance experience have a history of cooperation from which potential partners can ascertain cooperative strengths and weaknesses, perhaps contributing to better partner selection. Moreover, previous alliance experience may be a source of knowledge about how to manage alliances (Tsang, 1999; 2002). Thus, prior alliance experience may improve a new venture's capacity to contribute productively to marketing alliances. Similarly, observing multiple alliances by a new venture may alleviate investor uncertainty regarding the extent to which the firm can interact productively with partners.

Another advantage of marketing alliances is that they may provide access to customers in new product and geographic markets (Das et al., 1998; Park et al., 2004). New ventures with a well-established history of alliance participation become increasingly embedded in the social network of other firms, potentially gaining access to a large endowment of resources that can be leveraged through the focal marketing alliance (Powell et al., 1996; Uzzi & Gillespie, 2002). Moreover, engaging in many prior alliances may allow a new venture access to important market-related knowledge concerning, for example, new markets, emerging niches, maturing segments, and so on. Thus, through prior alliances and the contacts in other firms that result, alliance

experience can be a source of important knowledge that allows managers to more judiciously capitalize on the benefits a focal marketing alliance provides. By observing prior alliances, investors may be able to gather better information about the new venture's potential to leverage the benefits of a new marketing alliance.

Hypothesis 9: A new venture's cumulative abnormal returns upon the announcement of a marketing alliance increase as the new venture's prior alliance experience increases.

Technology Alliances and Alliance Experience. The ambiguity of technology alliances makes their benefits difficult to predict and the risks of failure are high (Park & Mezias, 2005; Ring & Van de Ven, 1992), so investor uncertainty about them can also be high (Das et al., 1998). Opportunism in technology alliances can be difficult to detect and prevent (Tyler & Steensma, 1998), and expropriated technology can be especially costly to new ventures (Alvarez & Barney, 2001). Moreover, the challenges associated with exchanging and developing technical knowledge, monitoring partners, and the possible need to protect proprietary technologies can tax the information processing capabilities of managers involved in these alliances (Tyler & Steensma, 1998). Given the challenges associated with technology alliances, the presence of alliance management knowledge and skills acquired through experience might be especially valuable. Thus, investors evaluating a firm engaged in a new technology alliance may look favorably on such experience.

Beyond the difficult of managing technology alliances, experience may make managers better equipped to benefit from this activity. Prior alliance contacts can be a source of referrals, which may make a new venture firm a more attractive partner and may also enable the new venture to select better partners (Powell et al., 1996; Uzzi,

1997). Further, prior alliances are a source of absorptive capacity that increases the likelihood of learning in a subsequent alliance, perhaps increasing its chances of success (Simonin, 1997). Similarly, experience enhances competency with a set of activities (Levitt & March 1988), so prior alliance experience may make managers more able to leverage absorbed technical knowledge. Being well-embedded in a network of other alliances may also reduce a firm's susceptibility to opportunism by providing external leveraging opportunities and reducing dependence on the focal alliance (Khanna et al., 1998). Thus, both the value created by these alliances and the new venture's ability to appropriate such value (Alvarez & Barney, 2001; Dyer & Singh, 1998) may increase as the firm gains alliance experience. Given the uncertainty associated with technological activities in new ventures (Heeley et al., 2007), investors may respond positively to prior alliance experience.

Hypothesis 10: A new venture's cumulative abnormal returns upon the announcement of a technology alliance increase as the new venture's prior alliance experience increases.

Partner Complementarity

Adler and Kwon (2002) argued that firms should use their external relationships to procure complementary resources, and there is evidence from a variety of contexts that complementarity is an important partner selection criterion (Chung et al., 2000; Hitt et al., 2000; Hitt, Ahlstrom, Dacin, Levitas, & Svobodina, 2004), especially among high technology firms (Ahuja, 2000a; King & Hegarty 2003; Park & Kim, 1997). A motivation for seeking complementarity is that, through alliances, firms may be able to create unique and valuable resource combinations that single firms cannot create (Das & Teng, 2000). Thus, complementarity potentially increases the value of resources

(Eisenhardt & Martin, 2000). It may also provide opportunities to create synergies in the alliance (Luo, 2002a). Further, combining complementary resources in alliances can be a potent source of lasting competitive advantage because the resource combinations may be to a large extent inimitable, as they are built on the resources of autonomous firms and may become specific to the partnership over time (Dyer & Singh, 1998; Harrison et al., 2001). Accessing external resources may be necessary to build such combinations, particularly when internal resource endowments are weak or underdeveloped (Sirmon et al., 2007; Winter, 2000). In support, there is some evidence that complementary resources are positively related to alliance performance (Luo, 2002a).

Marketing Alliances and Complementarity. There are many reasons why marketing alliances have the potential to generate significant value when they involve partners specialized in different market segments producing complementary products and services. Complementarity can result in supportive products and services that enhance the attractiveness of the firms' offerings to customers (Srivastava et al., 1998). For instance, a biotechnology firm with a computer intensive product (e.g., Affymetrix has genetic arrays coded on microchips) may be able to benefit greatly from an alliance that markets this product with advanced hardware (e.g., from Intel or IBM). Similarly, because resource requirements are heterogeneous across industries (Amit & Schoemaker, 1993), alliances with firms from outside a new venture's core market probably provide access to resources that are different from the firm's own endowment, enlarging the pool of possible complementarities available (Chung et al., 2000; Gulati, 1995).

Further, by partnering with firms in other markets, a new venture can enhance the customers exposed to its products, perhaps developing new applications that boost revenue opportunities. For instance, there is evidence from research on international market entries that forming alliances with partners that can provide market-related knowledge about the new country enhances the performance of small and medium sized enterprises entering those markets (Lu & Beamish, 2001). Similarly, Sivadas & Dwyer (2000) found evidence that partner complementarity enhanced the financial success of new products. In support of these arguments, Chan and colleagues (1997) found evidence that the partners as a whole create wealth when they form marketing alliances that span across industries.

Hypothesis 11: A new venture's cumulative abnormal returns upon the announcement of a marketing alliance are larger when there is complementarity between the new venture and its alliance partner.

Technology Alliances and Complementarity, Rather than partnering in technology alliances because there is technological overlap, many firms attempt to partner with other firms that have interdependent or complementary technologies (Gulati, 1995; Mowery et al., 1998). Indeed, many have argued that accessing complementary resources may be necessary to leverage the full potential of innovative product and service offerings (Chang, 2003; Colombo et al., 2006; De Meyer, 1999). Firms competing primarily in different markets may have resources specialized to the respective markets (Amit & Schoemaker, 1993). Thus, firms forming technology alliances with partners from other markets have the potential to combine complementary knowledge resources to generate more novel innovations that appeal to a wider array of customers (Cantwell, 2001). Stated different, complementarity achieved by combining

resources specialized to different markets may allow the partnering firms to develop innovations that neither had the expertise to create alone, perhaps saving time and financial resources spent while enhancing quality (Harrigan, 1985; Sivadas & Dwyer, 2000).

Moreover, Mowery and his colleagues (1998) noted that accessing complementary resources from an alliance partner can help a firm improve other areas of its operations. It may be necessary to enter alliance arrangements to secure the needed complementarities from autonomous suppliers and other external stakeholders. In support, accessing a diversity of knowledge resources from alliance partners has been positively linked to firm growth in new ventures (Baum et al., 2000), but resource constraints make attempting to construct such complementarities without alliances especially difficult (Gulati, 1995). Thus, investors may perceive that technology alliances are especially promising when they involve cooperation among firms that typically serve different markets.

Hypothesis 12: A new venture's cumulative abnormal returns upon the announcement of a technology alliance are larger when there is complementarity between the new venture and its alliance partner.

CHAPTER IV

METHODOLOGY

Data Sources

I identified the IPO firms using the Field-Ritter dataset, as used in Field and Karpof (2002) and Loughran and Ritter (2004). This dataset contains identifying information and founding dates for 7,378 IPO firms over a 19 year period (1975-2003). Data for the independent and dependent variables came primarily from the Thompson Corporation's Securities Data Company (SDC) Platinum database, the Wharton Research Data Services (WRDS) Center for Research on Security Prices (CRSP) database, CRSP Eventus software, and Standard and Poor's (S&P) COMPUSTAT database. As in prior research on IPO-stage new ventures, data from these sources was supplemented with information from news retrieval services such as Lexis-Nexis, company reports, and business publications (Certo et al., 2001; Pollock & Rindova, 2003; Stuart et al., 1999).

Sample

Firms completing IPOs from the beginning of 1995 until the end of 2000 are the primary sampling frame for this study. This time frame was selected to focus on recent IPOs, while allowing adequate time for data on post-IPO alliance formation. Two thousand one hundred forty nine (2149) firms completed an IPO during this time period. After the market crash in 2000 and the subsequent economic downturn, only 221 firms completed IPOs in the next three years, representing a substantial reduction from the average number completing IPOs before that time. The alliance data were from those announced from the beginning of 2001 until the end of 2006.

High technology industries were selected because firms from such industries represent a large portion of IPOs during this time period, and this proportion grew substantially after the 1980s and early 1990s (Ritter & Welch, 2002). The industries selected were as follows: chemicals/biotechnology (SIC 2800s), computer equipment (3500s), general electronics (3600s), transportation manufacturing (3700s), measurement instruments/optics (3800s), telecommunications (4800s), business services/e-commerce (SIC 7300s), and engineering/advertising/research services (SIC 8700s).

In addition, consistent with a theoretical focus on new ventures, firms older than ten years of age at the time of IPO were excluded (Carpenter et al., 2003; Certo et al., 2001). Finally, to be included in the sample, the firm had to have been involved in an announced marketing or technology alliance during the period 2001 to 2006. Using these criteria, the final sample contained 257 observations with complete data.

Dependent Variable and Event Study Technique

Event study methodology was used to calculate the dependent variable. This methodology captures investor responses to announced but previously unanticipated events (MacKinlay, 1997). The announcement reflects new information for investors, and given at least a semi-efficient market (Fama, 1970), they adjust their trading based on this new information (Fama, Fisher, Jensen, & Roll, 1969). To apply the methodology (MacKinlay, 1997; McWilliams & Siegel, 1997), one estimates the returns for a given firm, i , for a period of time, t , prior to the announced event (the estimation period) and regress this return on a market-wide index. The ordinary least squares regression equation, which is called the market model, is as follows:

$$R_{it} = \alpha + \beta (R_{mt}) + \epsilon_{it}$$

R_{it} is the return to firm i during time t . R_{mt} is the return on a market portfolio index during time t . ϵ_{it} is the error term. The parameter estimates, $\alpha + \beta$, vary from security to security. During the period surrounding the announcement in question (the event window), these parameter estimates are used to calculate the firm's expected return, given the market's return during that window. The difference between this expected return and the firm's actual return during the window represents an "abnormal" return. Positive and negative deviations correspond to positive and negative investor reaction, respectively (Lee, 2001). These abnormal returns are standardized and summed over the event window to compute cumulative abnormal returns (CARs).

The length of the estimation period must be long enough to generate reliable and unbiased estimates of the parameter estimates. Most strategic management studies on the market impact of alliance announcements have used estimation periods of at least 150 days. However, trading volume and stock prices can fluctuate greatly following an IPO (Ritter & Welch, 2002), particularly for new venture firms (Carter, Dark, & Singh, 1998). Thus, I use a longer period in an attempt to produce more stable estimates of the parameter estimates than would be probable with a shorter estimation period. To estimate the market model in the present study, I began 251 days prior to the event, which is approximately one year of trading days, and ended 10 days prior to the event (Park et al., 2004; Reuer & Koza, 2000). Terminating the estimation period 10 days prior to the event helps alleviate confounding between the event in question and the estimation of the market model.. Alliance announcements that occur within this 241 day period after IPO are excluded.

Multiple indexes can be used to estimate the market model. Scholars typically use CRSP (Chan et al., 1997; Koh & Venkatraman, 1991) or S&P 500 indexes (Anand & Khanna, 2000; Kale et al., 2002) to approximate the market return using data from CRSP. Scholars have also included value-weighted indices for the stock exchange on which the stock of the firm in question is traded (Das et al., 1998; Madhavan & Prescott, 1995; Merchant & Schendel, 2000). This approach is used for the present study because the market returns used to calculate the parameter estimates vary across exchanges (Brown & Warner, 1980; Ritter, 1991). In particular, I use the CRSP Value Weighted Index to estimate the baseline market model.

Finally, I selected narrow event windows. Long event windows are problematic because they increase the likelihood that confounding events (e.g., dividends announcements, earnings announcements, etc.) occur during the period surrounding the announcement of interest (Bromiley et al., 1988; McWilliams & McGee, 1997). Introducing such extraneous variance into the analysis weakens the power of the test (Brown & Warner, 1980; MacKinlay, 1997). In strategic management research on market reactions to strategic alliances, variation in the length of the event window is considerable. For instance, some event windows can be as high as 20 days with smaller intervals analyzed within the larger window (Anand & Khanna, 2000). The most common windows used are two or three day periods. Including days before the announcement accounts for the possibility that information about the event in question may have been leaked prior to the announcement, whereas including days after the announcement accounts for less than instantaneous market reaction (McWilliams & Siegel, 1997). In studies using multiple windows, statistically significant cumulative

abnormal returns are more likely to occur in the days immediately surrounding the announcement (Chan et al., 1997; Madhavan & Prescott, 1995; Reuer & Koza, 2000). To analyze the hypotheses, I use three event windows. The first one captures CARs on the day of the announcement only. The second is a three day window - the day of the announcement and the days immediately before and after it. The final window contains seven days, including the day of the announcement plus three days on either side of it.

Identifying and Modeling Alliances and CARs

SDC Joint Ventures/Alliances contains markers that identify alliance types. I coded marketing alliances as those identified as such in SDC, and I coded technology alliances as those identified as research and development, technology transfer, and/or technology alliances. Thus, the observations in the dataset are alliance announcements, and CARs are computed each time an alliance is announced. I used the CRSP Eventus software for this calculation.

Independent Variables

Many alliances involve more than two firms. Additionally, whereas the new venture firms were independently traded public companies at the time of the announcement, many of the alliance partners were subsidiaries of diversified corporations. As such, although measuring the variables for the single new ventures was relatively straightforward, measuring the data from multiple alliance partners in the same alliance was more complex. Under the assumption that the immediate alliance partner, relative to a separate or perhaps holding company parent, is a more direct indicator of the accessed resources signaled through an alliance announcement, I collected data on the subsidiary when available. In a small minority of cases, only data from the parent

company were available. In these cases, I used the data from the parent. For the alliances involving multiple partners, I followed research indicating that aggregated resources across partners are relevant in signaling theory (Reuber & Fischer, 2003; Stuart et al., 1999). Thus, for such alliances, I measured the variables by averaging the partners' scores.

Alliance partners' commercial resources and alliance partners' R&D resources are hypothesized to enhance the effects of marketing and technology alliance announcements, respectively, on cumulative abnormal returns (Hypotheses 1 and 2). The new venture's commercial resources and the new venture's R&D resources are also hypothesized to enhance the cumulative abnormal returns associated with the respective announcements (Hypotheses 5 and 6). For both new venture firms and their partners, commercial resources were measured in two ways. The first measure, *advertising intensity*, is the firm's advertising expenses weighted by its total net sales (Lu & Beamish, 2001). The second measure is a count of *new product announcements*, as commercial prominence is reflected in the ability to introduce products to the market (Rothaermel, 2001). I collect this variable using Lexis-Nexis searches of business publications. Because data on the new ventures was less readily available, I supplemented these searches with information from company press releases, the online business press, and company reports. In general, the new products data on the new venture's alliance partners came from Lexis-Nexis only. The measure is the cumulative number of announcements from 1996 until the alliance announcement, divided by the total number of years that the time period represents. Thus, this measure is *new products per year*. For both alliance partners, R&D resources are calculated as *R&D intensity*,

which is R&D expenses divided by net sales (Lu & Beamish, 2001). Data for both intensity measures was collected from COMPUSTAT.

The size of a new venture's alliance partner is hypothesized to increase the cumulative abnormal returns associated with marketing (Hypothesis 3) and technology (Hypothesis 4) alliance announcements. To measure this variable, I use *partner total assets*, which were collected from COMPUSTAT.

The uncertainty associated with a new venture is hypothesized to increase the effect of marketing alliances (Hypothesis 7) and technology alliances (Hypothesis 8) on cumulative abnormal returns. Because smaller and younger new ventures have more uncertainty associated with them (Folta & Janney, 2004; Sanders & Boivie, 2004), I used the following two measures. The first is new venture size, which is measured as the *new venture's total assets*. The second is *new venture age*, which is measured as the year of the alliance announcement less the year of the new venture's founding. Data for the first measure comes from COMPUSTAT, and the founding year for the second comes from the Field-Ritter dataset. Because the hypotheses posit positive relationships between new venture uncertainty and CARs, negative regression coefficients are expected for these two variables.

Finally, new venture *alliance partner experience* is hypothesized to increase the impact of marketing and technology alliances on cumulative abnormal returns (Hypotheses 9 and 10). This variable is measured as the count of the number of alliances in which a new venture had engaged from 2001 until the date of the alliance announcement (Sampson, 2007; Zollo et al., 2002).

Partner complementarity is hypothesized to enhance the effects of marketing and technology alliance announcements on a new venture's cumulative abnormal returns (Hypotheses 11 and 12). As noted, complementarity is more likely when resources are different than when they are the similar. In prior alliance research, scholars have inferred complementarity when the partnering firms compete in different segments or industries (Calabrese et al., 2000; Chung et al., 2000; Gulati & Gargiulo, 1999). In this spirit, using information from COMPUSTAT, complementarity is a dummy variable identifying whether or not the alliance partners have different 3-digit SIC codes. Assessing complementarity at the 3-digit level was selected to provide a more fine grained measure than a 2-digit measure provides.

Control Variables

Control variables were included in the analysis to capture the effects of other variables thought to influence IPO performance.

First, I included controls for the IPO firm's ownership structure. There is evidence that shares held by institutional investors are important in IPO-stage new ventures, perhaps because such holdings signal that a firm is well-governed and perhaps confident in its future earning potential (Aggarwal et al., 2002). Such holdings also affect investments, such as R&D, as well as trading volume and stock price fluctuation in post-IPO firms (Bushee, 1998). This measure, *external ownership*, was calculated as the percentage of the firm's outstanding stock owned by institutional investors. The new ventures' proxy statements include data on beneficial owners of more than 5.0 % of outstanding stock, and the percentage held by such owners was used to calculate this measure. In a small minority of cases, data on this variable were not available for a given

year but were available for the prior year. In these cases, I selected the data for the prior year. Data beyond one year prior were excluded.

Other research indicates that ownership by TMT members and directors can also reduce investor uncertainty regarding agency hazards stemming from inadequate incentive structures (Certo et al., 2003; Filatotchev & Bishop, 2002). Generally, this work suggests that investors value equity compensation plans that align manager and board member incentives with those of shareholders. Conceptually, the TMT and board members are the groups of individuals, including the CEO, who comprise a firm's dominant coalition (Cyert & March, 1963; Siegel & Hambrick, 2005). The new ventures' proxy statements include data on the percentage of outstanding stock held by officers and directors, and this percentage was used to measure *executive ownership*. For this variable, the same observations had current year data, but lacked prior year data, as occurred in measuring outside ownership. Thus, I included the prior year data in these cases, but data beyond one year in the past were excluded.

Also, in analyzing the marketing alliances, controls were inserted for the partners' R&D resources. In analyzing the technology alliances, I controlled for the partners' commercial resources. In the marketing alliance subsample, the focus was commercial resources, so I included new venture and partner R&D resources to partial out any effect they may have on the CARs associated with marketing alliances. In the technology alliance subsample, the focus was R&D resources. Thus, I included commercial resource controls in the technology alliance analysis to partial out their effects from the effects associated with R&D resources.

Finally, as in other IPO studies using samples that span multiple time periods, a series of year dummy variables are included to capture time-varying effects (Carpenter et al., 2003; Pollock & Rindova, 2003). The omitted variable is for 2006. Because multiple industries are included, I also incorporated a dummy variable identifying the new venture's industry (Certo et al., 2001; Sanders & Boivie, 2004). The omitted variable is for engineering/advertising/research services (8700s).

CHAPTER V

ANALYSES AND RESULTS

Statistical Analysis

The sample of alliances was divided into marketing and technology alliance subsamples to evaluate the hypotheses. The odd numbered hypotheses (Hypotheses 1, 3, 5, 7, 9, and 11) pertain to marketing alliances, and the even numbered hypotheses (Hypotheses 2, 4, 6, 8, 10, and 12) pertain to technology alliances. Given the dependent variable, ordinary least squares (OLS) regression is used. Because the partnering firms may be represented more than once in a given year but are not necessarily represented in every year, the dependent variable was modeled using STATA's cluster option and robust standard errors to account for non-independent error terms. In each test, the control variables were entered first, followed by the hypothesized independent variables of interest. The final sample consists of 132 observations and 125 observations for the marketing and technology alliance subsamples, respectively, for which complete data were available.

Assumptions of Multiple Regression

Before analyzing the hypotheses, I evaluated the extent to which the data conformed to key assumptions of multiple regression. In particular, I examined normality and outliers, homoskedasticity, and multicollinearity separately for each subsample and for each dependent variable. First, I evaluated normality and checked for outliers. Because many of the variables are measured on vastly different scales (e.g., the intensity variables versus total assets), the continuous controls and independent variables were standardized. After standardizing the variables, I analyzed the skewness statistics

and the histograms, finding that all of these variables were skewed, many of them severely so. To address this problem, I took the natural logarithm of these variables. After such transformations, this group of variables better approximated normality. Additionally, I used the leverage statistic (i.e., Stata's hat statistic) to check for outliers. Leverage statistics exceeding 0.5 indicate especially drastic outliers (Hamilton, 1992). None of my observations exceeded this criterion in any of the models. Thus, outliers do not appear to be a serious problem.

Second, using the transformed variables, I plotted the residuals and predicted y -values (i.e., y -hat) for all of the marketing and technology alliance hypothesized models (one day, three day, and seven day CARs for each of the two subsamples; six models in total). In general, the graphs indicated that the regressions produced a set of models that approximate homoskedasticity.

Third, I examined multicollinearity using both the bivariate correlation matrices, provided in Tables 1 and 2, and the variance inflation factors (VIF). For the marketing subsample bivariate correlations, I analyzed the (non-industry or -year dummy) control variables and independent variables, finding that the highest correlation was 0.59 (shared variance is approximately 0.35). This correlation was the only one over 0.50. Less than 4.0% of the correlations were greater than 0.40. Thus, analysis of the bivariate correlations suggests no serious multicollinearity violations. In analyzing multivariate multicollinearity using the VIF scores, the only two variables exceeding 10, which Neter, Wasserman, and Kutners (1989) caution is a sign of multicollinearity problems, were the industry dummy variables denoting chemicals/biotechnology firms (12.28) and business services/e-commerce firms (20.32). These scores represent tolerance values of

0.08 and 0.05, respectively, indicating that respectively about 92% and 95% of the variance in these two variables is shared with the other independent and control variables. Of the remaining non-industry and year dummies, only four variables have VIFs above the more stringent criterion of 2 set forth by Cohen, Cohen, Aiken, and West (2003), and the highest score was 2.55 (new venture total assets), indicating 61% shared variance. Moreover, every one of the industry and year dummies exceeded 2, and the highest score below 10 was 9.58, indicating 90% shared variance.

In the technology subsample, excluding the industry and year control variables, the highest bivariate correlation for was 0.53 (i.e., shared variance is approximately 0.28). Less than 6.5% of these correlations exceeded 0.40. In analyzing multivariate multicollinearity for the non-industry and year dummies, none had scores exceeding 10, only four exceeded 2, and the highest was 5.41 (new venture total assets), indicating 82% shared variance. Further, although none of the industry and year dummies had scores above 10, only three (computer equipment, telecommunications, and the year 2003) did not exceed 2, and the highest score among these variables was 5.14 (chemicals/biotechnology), indicating 81% shared variance.

Table 1
Marketing Alliances
Descriptive Statistics and Bivariate Correlations

Variable ^{ab}	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. 1-Day value weighted CARs ^c	0.04	0.13															
2. 3-Day value weighted CARs ^c	0.06	0.17	0.87														
3. 7-Day value weighted CARs ^c	0.06	0.18	0.76	0.87													
4. New venture executive ownership	0.71	0.39	0.16	0.10	0.04												
5. New venture external ownership	0.81	0.39	0.00	-0.07	-0.04	-0.18											
6. New venture advertising intensity	0.30	0.45	-0.01	-0.03	-0.02	0.01	-0.12										
7. New venture R&D intensity	0.18	0.35	0.07	0.08	0.03	-0.02	0.15	-0.22									
8. New venture total assets	0.33	0.43	-0.17	-0.13	-0.10	-0.19	-0.24	0.47	-0.24								
9. New venture age	1.13	0.31	-0.12	-0.09	-0.09	-0.16	0.06	-0.33	0.05	0.12							
10. New venture alliance experience	0.43	0.44	-0.09	-0.07	-0.03	-0.18	-0.21	0.20	-0.27	0.59	0.15						
11. New venture new products per year	0.33	0.41	-0.09	-0.01	0.06	-0.09	-0.09	0.24	-0.23	0.42	0.00	0.38					
12. Partner advertising intensity	0.33	0.45	-0.06	-0.05	0.03	0.07	0.01	0.14	-0.09	0.18	-0.10	0.11	0.18				
13. Partner R&D intensity	0.05	0.25	-0.07	-0.11	-0.08	-0.13	0.00	-0.06	0.34	-0.06	0.11	-0.10	-0.11	-0.12			
14. Partner total assets	0.24	0.38	0.12	0.16	0.09	0.05	-0.01	0.20	-0.09	0.05	-0.05	-0.03	-0.01	-0.01	-0.10		
15. Partner new products per year	0.26	0.40	0.09	0.22	0.11	-0.01	-0.06	0.08	-0.04	0.09	0.06	0.10	0.08	0.03	-0.10	0.35	
16. Complementarity	0.56	0.50	0.02	0.05	0.07	0.04	-0.07	0.03	-0.15	0.03	-0.05	0.03	0.04	0.15	-0.03	0.18	-0.15

a. N = 132.

b. Correlations of absolute value greater than .14 are statistically significant at $p < .10$, those greater than .17 are significant at $p < .05$, and those greater than .22 are significant at $p < .01$.

c. Dependent variable.

Table 2
Technology Alliances
Descriptive Statistics and Bivariate Correlations

Variable ^{ab}	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. 1-Day value weighted CARs ^c	0.03	0.12															
2. 3-Day value weighted CARs ^c	0.05	0.15	0.88														
3. 7-Day value weighted CARs ^c	0.04	0.17	0.78	0.82													
4. New venture executive ownership	0.14	0.27	0.06	0.07	-0.14												
5. New venture external ownership	0.92	0.39	-0.08	-0.05	-0.10	0.03											
6. New venture advertising intensity	0.11	0.31	0.02	0.02	0.02	-0.05	-0.08										
7. New venture R&D intensity	0.21	0.33	-0.04	-0.02	-0.07	-0.04	0.05	0.15									
8. New venture total assets	0.19	0.37	-0.13	-0.13	-0.10	-0.14	0.09	0.03	-0.20								
9. New venture age	1.17	0.33	-0.20	-0.25	-0.14	0.05	0.06	0.02	-0.08	0.17							
10. New venture alliance experience	0.46	0.43	-0.03	-0.05	-0.01	-0.13	0.18	-0.04	-0.25	0.43	0.21						
11. New venture new products per year	0.30	0.40	-0.07	-0.05	-0.04	-0.05	-0.16	-0.03	-0.36	0.46	0.22	0.48					
12. Partner advertising intensity	0.28	0.46	-0.03	0.00	-0.08	-0.04	0.18	-0.06	-0.12	-0.06	-0.01	-0.02	0.02				
13. Partner R&D intensity	0.09	0.33	-0.06	-0.08	-0.08	-0.03	0.01	0.34	0.39	-0.05	-0.03	-0.11	-0.16	-0.15			
14. Partner total assets	0.33	0.42	0.16	0.10	0.04	-0.02	0.03	-0.05	-0.16	0.03	-0.02	0.13	0.10	0.38	-0.19		
15. Partner new products per year	0.28	0.39	0.19	0.27	0.14	0.05	-0.03	-0.06	-0.12	0.01	0.05	0.01	0.18	0.35	-0.17	0.53	
16. Complementarity	0.50	0.50	0.01	0.02	0.13	-0.11	-0.08	-0.18	-0.26	0.13	-0.12	0.12	0.07	0.16	-0.10	0.23	0.02

a. N = 125.

b. Correlations of absolute value greater than .147 are statistically significant at $p < .10$, those greater than .17 are significant at $p < .05$, and those greater than .22 are significant at $p < .01$.

c. Dependent variable.

These results suggest that, aside from the set of industry and year dummy variables, extreme multicollinearity does not appear to be a serious concern for the independent and control variables in either the marketing or the technology subsamples.

In sum, the data and models approximate key assumptions of multiple regression. Heteroskedasticity, outliers, and multicollinearity are not serious concerns.

For ease of presentation, I present the results for the marketing and technology alliances separately. Marketing alliance results are presented first, followed by the technology alliance results. In addition, the results for the industry and year dummy variables, though included in Tables 3 (table on page 61) and 4 (table on page 66), are not discussed below.

Marketing Alliance Results

Analysis of the mean abnormal returns for the marketing alliance subsample reveals that the cumulative abnormal returns associated with marketing alliance announcements during the one day, three day, and seven day event windows were 4.23%, 5.71%, and 5.71%, respectively, and all three of these values were statistically significant at $p < .001$ (respectively, generalized sign $z = 3.598; 3.598; 3.424$). In addition, the abnormal returns on the day before the announcement were 1.49%, which was also statistically significant (generalized sign $z = 3.075; p < .01$). Three days before the announcement, the abnormal returns were .88%. This value was marginally statistically significant (generalized sign $z = 1.855; p < .10$). Interestingly, however, the abnormal returns for the new ventures three days after the announcement were -0.78%, which was statistically significant (generalized sign $z = -2.155; p < .05$). None of the other days in the focal event windows had statistically significant abnormal returns.

Therefore, there is some evidence of information leakage in the days preceding an announcement, and there is also some evidence of declining investor sentiment after the initial increase occurring upon a marketing alliance announcement. Further, consistent with the earlier argument that the abnormal returns associated with an announcement are often concentrated in a short event window, the absolute value of the abnormal returns on the announcement date were higher than the corresponding value for any other days in the focal event windows.

Regarding the hypothesized models, none of the sampled new venture firms from the transportation manufacturing industry formed one of these alliances during the period under investigation. Thus, the dummy variable for this industry was excluded by necessity from this analysis. In the control variable only models (Models 1, 3, and 5 in Table 3), the only control variable outside of year and industry dummies that was statistically significant was new venture R&D intensity. In the three day model, the variable's regression coefficient was positive and statistically significant ($b = 0.08$; $p < .01$), and it was positive and marginally statistically significant in the seven day model ($b = 0.05$; $p < .10$).

Table 3
Marketing Alliances
Results of OLS Regressions

Variable	One Day Value Weighted CARs			Three Day Value Weighted CARs			Seven Day Value Weighted CARs		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 5	Model 6	Model 6
	B	Robust SE	B	Robust SE	B	Robust SE	B	Robust SE	B
Intercept	0.01	0.04	0.11	0.12	0.00	0.06	0.08	0.12	-0.01
New venture executive ownership	0.06	0.03	0.06*	0.03	0.03	0.05	0.04	0.06	0.02
New venture external ownership	-0.02	0.02	-0.03	0.03	-0.05	0.04	-0.06	0.05	-0.03
New venture R&D intensity	0.02	0.02	0.01	0.02	0.08***	0.01	0.05**	0.02	0.05*
Partner R&D intensity	-0.03	0.03	-0.01	0.02	-0.07	0.04	-0.05*	0.02	-0.06
Chemicals/biotechnology (SIC 2800s)	0.00	0.06	0.07*	0.03	-0.02	0.07	0.05	0.08	-0.02
Computer equipment (SIC 3500s)	0.04	0.05	0.11**	0.03	0.06	0.06	0.12	0.07	0.08
General electronics (SIC 3600s)	0.02	0.05	0.08*	0.04	0.07	0.06	0.10	0.07	0.07
Measurement instruments/optics (SIC 3800s)	0.03	0.04	0.10**	0.03	0.04	0.02	0.10	0.05	0.03
Telecommunications (SIC 4800s)	0.02	0.08	0.11	0.06	0.00	0.06	0.09	0.05	0.06
Business services/e-commerce (SIC 7300s)	-0.03	0.04	0.01	0.04	0.00	0.03	0.02	0.07	0.04
Year 2001	0.01	0.01	-0.07	0.04	0.06***	0.01	-0.02	0.04	0.05**
Year 2002	0.03**	0.01	-0.04	0.03	0.07**	0.02	0.01	0.04	0.05*
Year 2003	0.02**	0.01	-0.03	0.02	0.06**	0.01	0.01	0.02	0.09**
Year 2004	-0.01*	0.00	-0.05**	0.01	0.03*	0.01	-0.01	0.02	0.03
Year 2005	0.07**	0.02	0.04	0.03	0.12**	0.03	0.09*	0.04	0.09**
Complementarity			-0.01	0.03			0.01	0.04	0.01
New venture age			-0.10*	0.04			-0.08	0.04	-0.10
New venture total assets			-0.06	0.05			-0.07	0.08	-0.08
Partner total assets			0.05	0.04			0.05	0.04	0.04
New venture alliance experience			0.01	0.03			0.01	0.05	0.01
New venture advertising intensity			0.03	0.03			0.02	0.03	0.02
Partner advertising intensity			-0.02	0.01			-0.02	0.02	0.00
New venture new products per year			0.00	0.01			0.03	0.02	0.05*
Partner new products per year			0.04*	0.02			0.10**	0.04	0.06**
R-Square	0.10		0.20		0.09		0.19		0.13
Change in R-Square			0.10				0.10		0.06

N = 132

* $p < .10$

** $p < .05$

*** $p < .01$

For the one, three, and seven day models, the control variables explained approximately 10%, 9%, and 6% of the total variance in new venture CARs, respectively. Addition of the primary independent variables explained roughly 10%, 10%, and 6% more, respectively. In the full models (Models 2, 4, and 6 in Table 3), the executive ownership variable is marginally statistically significant for one day CARs ($b = 0.06$; $p < .10$). New venture R&D intensity is positive and statistically significant for three day CARs ($b = 0.05$; $p < .05$) and is positive and marginally statistically significant for the seven day CARs ($b = 0.03$; $p < .10$). Finally, partner R&D intensity is negative and marginally statistically significant for the 3 day CARs ($b = -0.05$; $p < .10$).

Hypothesis 1 states that the commercial resources of a new venture's alliance partner are positively related to the new venture CARs associated with the announcement of a marketing alliance with that partner. Commercial resources are operationalized using the advertising intensity measure and new products per year. For the advertising intensity measure, none of the regression coefficients are statistically significant. The regression coefficients are -0.02, -0.02, and approximately 0.00 for the one day, three day, and seven days CARs, respectively. However, using the new products per year measure, this hypothesis received support. In particular, for the one day, three day, and seven day CARs models, the regression coefficients were 0.04 ($p < .10$), 0.10 ($p < .05$), and 0.06 ($p < .05$), respectively. Thus, Hypothesis 1 did not receive support using the advertising intensity measure, but the hypothesis did receive support using the new products per year measure.

Hypothesis 3 states that the size of the new venture's alliance partner is positively related to the new venture CARs associated with the announcement of a

marketing alliance with that partner. Partner firm size is operationalized as total assets. For the one day, three day, and seven day models, the regression coefficients were 0.05, 0.05, and 0.04, respectively; none of these coefficients were statistically significant. Therefore, Hypothesis 3 does not receive support.

Hypothesis 5 states that the new venture's commercial resources are positively related to the new venture CARs associated with the announcement of a marketing alliance. This variable is operationalized using the new venture's advertising intensity and new products per year. For the former measure, none of the three regression coefficients ($b = 0.03$; $b = 0.02$; $b = 0.02$ for one day, three day, and seven day CARs, respectively) are statistically significant. The latter measure, though not statistically significant in the one day or three day models ($b \sim 0.00$; $b = 0.03$), is positive and marginally statistically significant in the seven day model ($b = .05$; $p < .10$). Thus, across all six regressions coefficients, there is little support for Hypothesis 5.

Hypothesis 7 states that the uncertainty associated with a new venture is positively related to the new venture CARs associated with the announcement of a marketing alliance. I operationalized uncertainty using new venture age and total assets. Younger and smaller new ventures are presumed to have more uncertainty associated with them. Respectively, the coefficients for these variables were -0.10 ($p < .10$) and -0.06 (n.s.) in the one day model, -0.08 (n.s.) and -0.07 (n.s.) in the three day model, and -0.10 (n.s.) and -0.08 (n.s.) in the seven day model. Thus, of the six regression coefficients used to test this hypothesis, only one was marginally statistically significant. Thus, there is little support for Hypothesis 7.

Hypothesis 9 predicts that a new venture's alliance experience is positively related to the new venture CARs associated with the announcement of a marketing alliance. As noted, this variable was operationalized as a count of the new venture's previous alliances. For the one day, three day, and seven day models, none of the regression coefficients ($b = 0.01$; $b = 0.01$; $b = 0.01$, respectively) for this variable were statistically significant. Thus, Hypothesis 9 received no supported.

Hypothesis 11 predicts that the presence of complementarity among the partners is positively related to the new venture CARs associated with a marketing alliance announcement. This variable was operationalized as a dummy variable indicating whether or not the partners are in different 3-digit SIC industries. For the one day, three day, and seven day models, none of the regression coefficients ($b = -0.01$; $b = 0.01$; $b = 0.01$, respectively) for this variable were statistically significant. Thus, Hypothesis 11 does not receive support.

Technology Alliance Results

The mean cumulative abnormal returns associated with a technology alliance announcement for the one day, three day, and seven day event windows were 3.48%, 4.62%, and 4.49%, respectively, and all three values were statistically significant at $p < .01$ (respectively, generalized sign $z = 3.026$; 3.026; 2.668). Additionally, the mean abnormal returns for the announcement date and the day after were 3.48% and 0.62%, respectively, and both were statistically significant (respectively, generalized sign $z = 3.026$; $p < .01$ and 2.131; $p < .05$). None of the other days in the focal event windows had statistically significant abnormal returns. These results suggest investors tend to

react positively on the announcement date, but do not always react instantaneously to new venture technology alliance announcements. However, as with marketing alliances, the highest absolute value of abnormal returns occurs on the announcement date.

In the technology alliance models, the transportation manufacturing industry (SIC 3700s) dummy variable had variance and was included. In the control variable only model for one day CARs, new venture new products per year was negative and statistically significant ($b = -0.11$; $p < .05$). In the control only model for three day CARs (Models 1, 3, and 5 in Table 4), new venture advertising intensity was positive and statistically significant ($b = 0.04$; $p < .05$). Finally, in the seven day CARs model, new venture executive ownership was negative and statistically significant ($b = -0.09$; $p < .05$) and partner advertising intensity was also negative and statistically significant ($b = -0.08$; $p < .05$). The control only models contained no other statistically significant regression coefficients. For the one day, three day, and seven day CARs models, the control variables explained roughly 28%, 22%, and 26% of the variance in the dependent variable.

Table 4
Technology Alliances
Results of OLS Regressions

Variable	One Day Value Weighted CARs			Three Day Value Weighted CARs			Seven Day Value Weighted CARs		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 5	Model 6	Model 6
	B	Robust SE	B	Robust SE	B	Robust SE	B	Robust SE	B
Intercept	0.02	0.03	0.17	0.14	0.00	0.04	0.19	0.06	0.21
New venture executive ownership	0.03	0.04	0.04	0.02	0.04	0.07	0.06	0.06	-0.08
New venture external ownership	0.00	0.03	-0.01	0.02	0.01	0.03	0.00	0.02	-0.01
New venture advertising intensity	0.02	0.01	0.03	0.02	0.04**	0.01	0.06**	0.02	0.05
Partner advertising intensity	-0.03	0.02	-0.03	0.02	-0.04	0.04	-0.05	0.03	-0.08**
New venture new products per year	-0.11**	0.04	-0.05	0.05	-0.07	0.04	-0.01	0.06	-0.03
Partner new products per year	0.06	0.05	0.06	0.07	0.10	0.08	0.12	0.10	0.09
Chemicals/biotechnology (SIC 2800s)	-0.01	0.03	-0.05	0.04	-0.04	0.04	-0.06	0.05	-0.09
Computer equipment (SIC 3500s)	0.06**	0.02	0.02	0.04	0.01	0.03	-0.03	0.05	0.02
General electronics (SIC 3600s)	0.18**	0.05	0.10	0.07	0.13**	0.04	0.06	0.07	0.06
Transportation manufacturing (SIC 3700s)	0.04	0.02	0.23**	0.08	0.00	0.03	0.17	0.12	0.23
Measurement instruments/optics (SIC 3800s)	0.02	0.03	0.00	0.04	0.01	0.04	0.00	0.07	-0.03
Telecommunications (SIC 4800s)	0.24***	0.05	0.27***	0.04	0.06	0.08	0.09*	0.04	0.24***
Business services/e-commerce (SIC 7300s)	0.01	0.05	-0.08	0.05	-0.03	0.08	-0.11	0.08	-0.09**
Year 2001	-0.01	0.01	-0.03	0.03	0.03**	0.01	-0.02	0.03	-0.05
Year 2002	0.03**	0.01	0.01	0.03	0.10**	0.01	0.06	0.03	0.05
Year 2003	0.01	0.02	0.02	0.02	0.04	0.03	0.03	0.02	0.01
Year 2004	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.03	0.01
Year 2005	0.02*	0.01	0.01	0.01	0.06***	0.01	0.04***	0.01	0.06*
Complementarity			-0.03	0.05			-0.01	0.06	0.02
New venture age			-0.08	0.07			-0.12	0.09	-0.07
New venture total assets			-0.16**	0.06			-0.15	0.09	-0.19
Partner total assets			0.02	0.04			-0.02	0.05	-0.04
New venture alliance experience			0.06	0.04			0.05	0.06	0.03
New venture R&D intensity			-0.02	0.02			0.00	0.04	-0.02
Partner R&D intensity			-0.01	0.02			-0.03	0.03	-0.03
R-Square	0.28		0.38		0.22		0.29		0.31
Change in R-Square			0.10				0.07		0.05

N = 125

* $p < .10$

** $p < .05$

*** $p < .01$

In the full models, outside of year and industry dummies, none of the control variables were statistically significant for one day CARs, new venture advertising intensity ($b = 0.06$; $p < .05$) was positive and statistically significant for three day CARs, and partner advertising intensity was negative and statistically significant ($b = -0.08$; $p < .05$) for seven day CARs. None of the other control variables were statistically significant in any of the full models. For the one day, three day, and seven day models, addition of the hypothesized independent variables explained approximately 10%, 7%, and 5% additional variance in the dependent variables, respectively.

Hypothesis 2 predicts that the R&D resources of a new venture's partner are positively related to the new venture CARs associated with a technology alliance announcement. This variable is operationalized as R&D intensity. The regression coefficients for the one day, three day, and seven day CARs models were -0.01, -0.03, and -0.03, respectively, and none of these coefficients were statistically significant. Thus, Hypothesis 2 is not supported.

Hypothesis 4 predicts that the size of a new venture's partner is positively related to the new venture CARs associated with a technology alliance announcement. This variable is operationalized using total assets. The regression coefficients for the one day, three day, and seven day CARs models ($b = 0.02$; $b = -0.02$; $b = -0.04$) were not statistically significant. Thus, Hypothesis 4 is not supported.

Hypothesis 6 states that a new venture's R&D resources are positively related to its CARs upon a technology alliance announcement. This variable is operationalized as R&D intensity. The regression coefficients for the one day, three day, and seven day

CARs models ($b = -0.02$; $b \sim 0.0$; $b = -0.02$) were not statistically significant. Thus, Hypothesis 6 is not supported.

Hypothesis 8 states that the uncertainty associated with a new venture is positively related to its CARs upon the announcement of a technology alliance. This variable is operationalized using the new venture's age and total assets (i.e., size). The regression coefficients for new venture age were -0.08, -0.12, and -0.07 in the one day, three day, and seven day CARs models, and none were statistically significant. For new venture size, the regression coefficient was negative and statistically significant in the one day model ($b = -0.16$; $p < .05$), but neither regression coefficient was statistically significant in either the three day or the seven day models ($b = -0.15$; $b = -0.19$, respectively). Thus, of the six coefficients used to test this hypothesis, only one supported Hypothesis 8. As such, it received little support.

Hypothesis 10 predicts that the CARs associated with a technology alliance announcement are higher as the new venture's alliance experience increases. Again, this variable was operationalized as the sum of the new venture's prior alliances, as reported above. In the one day, three day, and seven day CARs models, none of the regression coefficients ($b = .06$; $b = .05$; $b = .03$, respectively) were statistically significant. Thus, Hypothesis 10 is not supported.

Lastly, Hypothesis 12 indicates that the CARs associated with a technology alliance announcement are higher when there is complementarity between the partners. This variable is operationalized as a dummy variable indicating whether or not the partners are in different 3-digit SIC industries. The regression coefficients for the one

day, three day, and seven day models were -0.03, -0.01, and 0.02, none of which were statistically significant. Thus, Hypothesis 12 is not supported.

Results by Event Window

Strategic management scholars using event study methodology for research on strategic alliances use various event windows. To provide additional insight, scholars sometimes use multiple windows within a single study (e.g., Anand & Khanna, 2000; Das et al., 1998). This section contains interpretation and additional comments on this study's results by event window.

For the first event window, one-day value (day 0) weighted CARs is the dependent variable. Narrow event windows can improve power by reducing the likelihood of extraneous confounding events (Brown & Warner, 1980; MacKinlay, 1997). However, if market reaction to all of the information in announcements is not always instantaneous, extremely short windows can miss some of the changes in trading behavior and returns that are of interest (e.g., Fama et al., 1969; Fama, 1970). In the full model using one-day CARs in the marketing subsample (Model 2), the control variable executive ownership (positive; $p < .10$), the new venture age variable (negative; $p < .10$), and the partner new products variable (positive; $p < .10$) approach statistical significance. Outside of the industry and year dummies, no other variables did so. In the corresponding model (Model 2) in the technology subsample, except for the industry and year variables, only new venture total assets (negative; $p < .05$) was statistically significant. Of the five hypotheses pertaining to marketing alliances, using this window only, there was limited support for Hypotheses 1 and 7. In the technology subsample, there was limited support for one (Hypothesis 8) of the five hypotheses pertaining to

technology alliances. Stated differently, in marketing alliances, there was marginal support for the commercial resources and new venture uncertainty hypotheses for one of the two indicators used to operationalize each construct. In technology alliances, there was partial support for the new venture uncertainty hypothesis at conventional significance levels. Consistent with the idea that shorter windows increase power, these models explained the most variance in CARs in both subsamples. However, outside of the industry and year controls, the models using this event window contained the same number of statistically significant or marginally statistically significant effects as the models used with the other two event windows. In the marketing subsample, there were three such effects per window and in the technology subsample, there was one such effect per window.

A three-day window allows for information leaks that occur before the announcement and for less than instantaneous market reaction after the announcements (McWilliams & Siegel, 1997). Studying the days immediately surrounding the announcement date is common in research in this area (e.g., Das et al., 1998; Park & Mezas, 2005; Reuer & Koza, 2000). In the present study, for the full model (Model 4) in the marketing subsample using three-day (days -1, 0, and 1) value weighted CARs, the control variable new venture R&D intensity (positive; $p < .05$) is statistically significant and the control variable partner R&D intensity (negative; $p < .10$) is marginally statistically significant. Outside of the industry and year controls, the only other variable that is statistically significant is the partner new products variable (positive; $p < .05$). In the corresponding model (Model 4) for the technology subsample, except for the industry and year dummies, the only variable that is statistically

significant is new venture advertising intensity (positive; $p < .05$). Thus, in the marketing alliances, there was partial support for the commercial resources hypothesis (Hypothesis 1) using one of the indicators for that construct. Tentatively, the marginal negative effect of partner R&D intensity in the marketing subsample may indicate that investors discount complementarity when an R&D intensive partner firm contributes the resources that complement the alliance activities. Though not hypothesized, the new venture R&D intensity control variable is positively related to three-day CARs in the marketing subsample and the new venture advertising intensity control variable is positively related to the dependent variable in the technology subsample. These results offer tentative evidence that investors value complementarity in a new venture's marketing and technology alliances (as discussed more fully in Chapter VI below), especially when the new venture has the resources that complement the alliance activities. Finally, although the length of the event window suggests that these models might have the second most explained variance, the models explain the second most variance and the third most variance in the marketing and technology subsamples, respectively.

As noted, strategic management scholars using a seven-day window increase the likelihood of tracking the trading behavior and stock price movements that are of interest, but may also increase the likelihood that confounding events distort the results or weaken power (Bromiley et al., 1989; McWilliams & Siegel, 1997). In the present study, for the full model (Model 6) using seven-day (days -3, -2, -1, 0, 1, 2, and 3) CARs as the dependent variable in the marketing subsample, the control variable new venture R&D intensity is marginally statistically significant (positive; $p < .10$). Other than the industry and year controls, the only other variables approaching statistical significance

are the new venture new products per year measure (positive; $p < .10$) and the partner new products per year measure (positive; $p < .05$). In the corresponding model for the technology subsample, the relationship between partner advertising intensity negative; $p < .05$) and CARs was the only statistically significant effect for variables other than those controlling for industry and year. As such, in the marketing alliances, there was marginal support for one indicator of new venture commercial resources and there was full support for one indicator of partner commercial resources, providing limited support for Hypothesis 5 and partial support for Hypothesis 1, respectively. In the technology alliances, none of the five hypotheses was supported, but the negative relationship between partner advertising intensity and CARs in the seven day model loosely parallels the negative relationship between partner R&D intensity and CARs in the three-day marketing alliances results. Together, these two results are tentative evidence that some investors may discount complementarity when the partner firm has the resources that complement the alliance activities. Lastly, in contrast to the expectation that they would explain the least variance in the dependent variable, the models explain the least variance and the second most variance in the marketing and technology subsamples, respectively.

CHAPTER VI

SUMMARY AND DISCUSSION

In this dissertation, I integrated signaling theory with resource-based theory on strategic alliances to ascertain the signals associated with the resources that new ventures potentially access through their alliances. Investor responses to alliance announcements were used to test the theoretical arguments proposed. The theoretical logic was based on the argument that new ventures send multiple signals in the months and years surrounding an IPO, and investors likely use multiple signals to ascertain the performance prospects of such firms (Ang & Brau, 2003; Folta & Janney, 2004; Pollock et al., 2008). In general, signaling theory suggests that signals must be observable, the qualities of interest must be inversely proportional to the costs of sending the signal, and the signal must be similarly inimitable by lower quality entities (Certo, 2003; Spence, 1973). From this perspective, the presence of multiple signals communicating consistent information enhances interpretation, as they allow receivers to cross validate the information they contain (Heil & Robertson, 1991).

From a resource-based perspective, a key purpose of strategic alliances is to gain access to the resources of other firms (Hitt et al., 2000; Ireland et al., 2002). For new ventures that otherwise have limited resources, forming strategic alliances with firms that have the needed resources can be especially valuable (Powell et al., 1996; Stuart et al., 1999). Despite the importance of strategic alliances as way for new ventures to access resources, these firms are also vulnerable to some of the challenges associated with strategic alliances, such as the complexity of managing them to achieve their benefits (Khanna et al., 1998), partner opportunism (Hamel, 1991), and overdependence

on partners (Miner et al., 1990). Thus, new ventures may need to approach their alliances with caution, particularly with respect to the partners with whom they form such alliances.

Drawing on this base, a central argument in this dissertation is that the resources potentially accessed through strategic alliances may be important signals to investors evaluating a new venture's performance prospects. In general, scholars have separated alliances into broad categories representing marketing alliances that perform downstream value chain activities and technology alliances that perform upstream activities (Das et al., 1998; Hagedoorn, 1993; Park & Mezas, 2005). This line of research suggests that these alliances make different resources available to the participating firms. The former enhances access to customers, distribution channels, new markets, and so on. The latter provides access to resources, such as technical knowledge, engineering skills, new technologies, and so on. Because these alliances are relatively well-defined in the literature with respect to the resources that can be accessed and because such access may serve as signals to investors evaluating a participating firm, I used this dichotomy to frame my theory and empirical analysis.

In general, however, my hypotheses received limited support. In the following section, I discuss the hypotheses individually, attempting to explain the implications of the findings theoretically and methodologically. For all of the hypotheses, I discuss the theoretical and methodological limitations of my approach, and offer research suggestions for future work in this area.

Implications, Limitations, and Future Research Suggestions

Hypothesis 1 was generally supported across all three dependent variables (one day, three day, and seven day) for the new products per year measure but was not supported in any of the models for the advertising intensity measure. The theoretical logic underlying this hypothesis was that marketing alliances provide access to resources targeted toward the commercialization of product and service offerings. From the perspective that consistency enhances signal quality, I predicted that investors would respond favorably to alliance announcements when the new venture's partner possesses strong commercial resources. Support for this hypothesis with the new products introduction measure, but not with the advertising intensity measure, may reflect that the former is a stronger indicator of the ability to commercialize products than is the latter.

Moreover, many partners are high technology firms that serve other business customers and rely little on advertising. Indeed, in this context, the ability to repeatedly introduce well-received new products may also obviate the need for advertising to some extent. Thus, though these firms may have strong commercial resources, this strength may not be reflected in advertising expenditures. In this sense, although the advertising and new products measures were intended to capture the same construct, commercial resources, perhaps they are capturing different phenomena. Future research on the construct validity of these and similar measures might improve our understanding of them. For example, in the marketing subsample, the correlation between these two measures is .03. As such, an interesting question is whether they are capturing different constructs or different aspects of the same construct. In addition to commercial resources, for instance, advertising may reflect efforts to manage a firm's image with the

media and investors, and new product introductions may reflect multiple aspects of innovativeness. Finally, industries vary widely in the number of new products participants introduce per year. For instance, it may take decades to develop and market a new drug, but software improvements may happen multiple times in a year. Therefore, a measure that captures new product introductions relative to industry averages might be a more robust indicator than that included in the present study.

Similarly, Hypothesis 2 was formulated on the premise that forming a technology alliance with a partner with strong R&D resources would be a consistent signal that would be attractive to investors. The percentage of net sales spent on R&D (R&D intensity) was used to evaluate this hypothesis, but it was not supported in any of the models. One explanation may be that significant R&D expenditures by an alliance partner may give it a bargaining power advantage in the alliance based on its ability to contribute these resources to or withhold them from the focal alliance. This advantage might allow partners to appropriate much of the value the alliance creates. It might also underlie a partner's ability to opportunistically expropriate a new venture's technology (Alvarez & Barney, 2001; Hamel, 1991). Investors concerned about such possibilities may react negatively, perhaps producing a null effect by negating the positive signals associated with technology alliance formation with an R&D intensive firm. Whether and how investors perceive inter-partner dynamics and whether and how such information affects investor evaluation are interesting questions for future research to address.

In addition, though R&D intensity may indicate the quantity of resources a firm invests in R&D, the measure may be inadequate for representing the quality of the innovative resources that partner can bring to a technology alliance. How and to what

extent partner R&D spending contributes to the success of a technology alliance are interesting questions. Using partner perceptions of alliance performance as the dependent variable may be a way to address this question (e.g., Li & Atuahene-Gima, 2002; Poppo & Zenger, 2002; Robins, Tallman, & Fladmoe-Lindquist, 2002). Similarly, how and to what extent does each partner's R&D spending influences firm-level performance outcomes? In addition to perceptions, objective indicators (e.g., firm market returns, survival, growth, etc.) could be used to address the second questions (e.g., Baum et al., 2000; Kale et al., 2002; Miner et al., 1990).

Hypothesis 3 predicted a positive relationship between a partner's size and the CARs associated with a marketing alliance announcement. Similarly, Hypothesis 4 predicted that the relationship would hold in technology alliance announcements as well. The foundation for these hypotheses was that signals emanating from leading organizations may be more credible, as these organizations are thought to be better evaluators, to avoid associating with inferior firms, and to have more partnering options at their disposal (Ndofor & Levitas, 2004; Stuart, 1998). For marketing alliances, the positive effects of allying with a large partner were also expected to be strengthened by the potential for the new venture to tap into a large partner's revenue stream and customer base. In technology alliances, the visibility, reputation, and legitimacy of a large alliance partner was expected to alleviate some of the information asymmetry associated with technological activity. However, neither hypothesis was supported in any of the models.

Perhaps the size of an alliance partner is an inadequate proxy for the extent to which a partner's endorsement would be valued because of the prestige associated with

that partner. Indeed, the size of a firm may not fully reflect the extent to which it is a leading firm, as many large firms are not industry leaders. The measure may also reflect inter-industry differences. Moreover, the benefits of increasingly large size are limited, and it may indeed be a liability in some cases (Hitt et al., 1997; Lu & Beamish, 2004). Thus, future research should adopt a more fine-grained approach to identifying the characteristics of partners that make their endorsements valuable to investors (e.g., Stuart et al., 1999). For instance, a more precise measure of the endorsement value of leading firms would involve gauging the perceptions of investors about the prestige associated with those firms (Certo, 2003). In addition, measuring how well past alliance partners performed during and after their alliances with a focal firm could indicate its partner selection capabilities, thereby providing indirect information on the value of its endorsement.

Hypothesis 5 suggested that a new venture's commercial resources would be positively related to the CARs generated upon a marketing alliance announcement. The logic was similar to that offered above in support of Hypotheses 1 and 2, in that possessing strong commercial resources and forming a marketing alliance enhances signal consistency. Again, the hypothesis was not supported for the advertising intensity variable and received limited support with the new venture new products per year measure. Although the correlation ($r = 0.35$) between the two measures was higher in the technology subsample than in the marketing subsample, considerable unshared variance remains, raising questions about the constructs underlying the measures.

Further, the shortcomings of the advertising intensity measure are again relevant, but the new products measure suffers limitations as well. First, it is operationalized as

the number of new products introduced per year from 1996 until the alliance announcement. Thus, for some observations, it contained new product introductions over a ten year period. Perhaps investors are concerned with recent history when evaluating commercial resources. Constructing the measure in tighter windows (e.g., one to five years prior to the announcement) might address this issue. Moreover, because adequate data on the new ventures was not always available from Lexis-Nexis, I supplemented these data liberally with press releases, annual reports, and the online business press. This approach may have introduced additional error into the measure because firms issue and document their press releases differently and also differ in how openly they discuss new products in annual reports. Also, articles published online may be unevenly accessible and are accessible for varying lengths of time. These measurement errors may explain why the results for the partner new products measure, which had more consistent collection procedures due to data availability, produced stronger results. Having additional people code new product introductions and establishing inter-rater reliability would also help address some of these concerns.

For Hypothesis 6, I predicted that a new venture's R&D resources would be positively related to the CARs associated with its announcement of a technology alliance. Again, my logic relied primarily on the benefits of signal consistency. However, this hypothesis was not supported in any of the models. Beyond the potential weaknesses of this measure discussed above, the results of this variable as a control in the marketing alliance subsample points to an interesting possibility. In the marketing alliance subsample, this variable is positive and at least marginally statistically significant in two of the three CARs windows. Perhaps these results suggest that

investors value complementarity, in addition to consistency, in a new venture's alliance activities, especially when the new venture is the one with resources that complement the alliance activities.

Indeed, in the marketing subsample, the R&D intensity (R&D per dollar of sales) of the new ventures was over three times higher than that of their partners; in the technology subsample, new venture R&D intensity was over twice that of partner R&D intensity. In knowledge intensive high technology industries such as those studied herein, the structures and incentive schemes found in many high technology new ventures often provide innovation advantages (Alvarez & Barney, 2001; Zahra, 2005). In turn, many of these innovative firms partner with more established firms that provide commercial resources associated with marketing and distribution (Rothaermel, 2001; Williamson, 1985). Perhaps investors perceive that new ventures with innovative technologies stand to benefit more from an alliance focused on commercializing those technologies (e.g., a marketing alliance) than from an alliance devoted to developing new technologies (e.g., a technology alliance). Similarly, investors may perceive that firms with especially valuable commercial resources could benefit by developing valuable technologies through a technology alliance. The positive effect of new venture advertising intensity in one of the full technology alliance models is limited evidence in support of this argument. This logic is consistent with the argument that complementarity is more likely when firms contribute different, rather than similar or consistent, resources (Harrison et al., 1991; Hitt et al., 2001a). Research in this area suggests that similarity enhances existing strengths and weaknesses, perhaps creating redundancies as well, whereas differences offer more possibilities for synergies.

Building on earlier research discussing the benefits of complementarity in alliances (Harrison et al., 2001; Hitt et al., 2000; Luo, 2002a), future work that approaches investor reactions to marketing and technology alliances from the perspective of complementarity, rather than signal consistency only, might help address these issues.

Hypotheses 7 and 8 argued that new ventures CARs would be higher upon a marketing or technology alliance announcement when there was more uncertainty associated with the new ventures. The logic is based on well-established arguments from signaling theory that signals of quality are more valuable information tools when there is more uncertainty about that quality (Janney & Folta, 2006; Lee, 2001; Sanders & Boivie 2004). Uncertainty was measured using firm age and size. The former was supported in one of the models in the marketing alliance subsample and the latter was supported in one of the models from the technology alliance subsample.

Although signals may be more valued as uncertainty increases, it is possible that forming marketing or technology alliances adds to the uncertainty confronting investors. Indeed, many alliances fail to produce the desired results (Inkpen, 2001; Ireland et al., 2002). Moreover, there is evidence that investors are sometimes cautious regarding new ventures heavily dependent on technology because of its unpredictable nature (Heeley et al., 2007). Using similar logic, it is possible that investors are also wary of some marketing alliance activities, as their outcomes can also be difficult to predict. For instance, aggressive marketing tactics may expose a firm to harmful retaliation from other firms (Chen, Smith, Grimm, 1992; Chen & Miller, 1994). Likewise, as noted, the resource-base of small and young firms may make them especially vulnerable to the downsides of alliances, perhaps causing some investors to react negatively. Lastly,

perhaps the process of undergoing an IPO and the associated media attention (Pollock et al., 2008; Ravasi & Marchisio, 2003), coupled with the age and size of the sampled firms (means were 10 years old and \$1.407 billion, respectively) at the time of the alliance announcements, has alleviated some of the uncertainty associated with these firms, thereby reducing the importance of signaling through alliance formation.

Hypotheses 9 and 10 posited that new venture CARs would increase as the new venture's alliance experience increases. These hypotheses were not supported. Scholars studying alliance experience have cautioned, not only that experience itself is an inadequate reflection of learning (Levinthal & March, 1993), but also that managers may sometimes over-generalize experiences acquired in one alliance to situations confronted in subsequent alliances (Zollo et al., 2000). This possibility is analogous to the argument that entrepreneurs often construct expectations by inaccurately generalizing from small samples (Holcomb, Ireland, Holmes, & Hitt, 2008). Thus, some scholars studying alliance experience have noted that partner-specific experience may be a better predictor of performance outcomes than is general alliance experience (Sampson, 2005; Zollo et al., 2002).

Additionally, to the extent that prior alliance experience includes alliances that remain active, the number of prior alliances may be capturing the extent to which the new venture's alliance management capabilities are being extended, as there are limits to the number of alliances firms can effectively operate (Rothaermel, 2001; Rothaermel & Deeds, 2006). Moreover, this measure captured alliances from the year 2001 until the date of the announcement. As such, the data were left censored, introducing error into the measure. Finally, because experience in one domain may be difficult to transfer to

another domain (Hatch & Dyer, 2004), it is possible that investors perceive that prior marketing alliances primarily prepare a firm to succeed in other marketing alliances. Likewise, investors may perceive that technology alliances provide important learning opportunities for future technology alliances. Because the general alliance experience variable used herein is not segmented by alliance type, such possibilities are not observable. However, the argument that investors believe the benefits of alliance experience are confined to similar alliances should be studied more thoroughly in future research.

Finally, Hypotheses 11 and 12 posited that complementarity enhances the effect of marketing and technology alliance announcements on new venture CARs. Though the benefits of complementarity are well-established theoretically (as discussed above), perhaps measuring this variable with a coarse-grained dummy variable indicating whether or not the partners are in different 3-digit SIC codes was inadequate. Indeed, rather than complementarity, this measure might reflect strategic alliances that represent diversification efforts by the partnering firms. Furthermore, scholars have previously criticized the shortcomings of SIC codes for measuring a firm's resource endowment (Robins & Wiersema, 1995). A better measure might be the differences in specific resource endowments of the respective firms, proxied by difference scores on important resource expenditures, as these differences indicate the potential for complementarity (e.g., Harrison et al., 1991). However, because commercial resources and R&D resources were already included in the model, I hesitated to include a difference score across these measures as an additional variable.

Nonetheless, given these results and the aforementioned possibility that investors might be responding to complementarity rather than consistency, perhaps reconstructing the theory and analysis to examine this possibility deserves further discussion. In addition to capturing differences in resource endowments, measures of resource complementarity based on survey questions (e.g., Luo, 2002a), policy capturing (e.g., Hitt et al., 2000), and detailed evaluation of firm resource endowments (e.g., Dussauge, Garrette, & Mitchell, 2000) and market positions (e.g., Gulati, 1995) are recommended. These approaches could provide ordinal or continuous measures quantifying how different the two firms' resource endowments are, which is preferable to the current dichotomous variable indicating whether or not the firms compete in different industry segments.

Importantly, other comments on the study as a whole deserve attention. Although the dichotomy between marketing alliances and technology alliances is well-established in the literature, it is possible that many alliances cross these categories and perform activities consistent with both. Rather than focus on the separation between these two alliance types based on the activities performed, more precisely delineating the alliance management context based on other factors may be a fruitful way to approach future research in this area. Indeed, the scope of activities included in otherwise similar alliances can vary (Li, Eden, Hitt, & Ireland, 2008; Oxley & Sampson, 2004). In future research, perhaps scholars could evaluate samples of marketing and technology alliances as a whole, rather than in two subsamples, and then predict abnormal returns in a manner similar to that used herein. Moreover, instead of focusing on the coarse-grained conceptualization and measurement of signal consistency, more rigorous theorizing to

explain what investors do and do not value in new venture alliance announcements could be especially useful. Given the limited results that investors consider complementarity, perhaps research in this area would be a good starting point. Additionally, SDC data contains some irregularities, such as inaccurate alliance coding and estimated announcement dates. Indeed, approximately one fourth of the sampled alliances had an alliance date that was estimated in the SDC database. In event studies, specification of the event time is important, as the technique relies on the event occurring to construct the dependent variable and is therefore weakened by imprecision around the focal event (Bromiley et al., 1988; McWilliams & Siegel, 1995). In response, some scholars have begun making considerable adjustments to the data before using them in fine-grained analysis (Anand & Khanna, 2000). Future research using SDC data would be well-advised to consider such issues. Finally, the lack of robust results may reflect the high multivariate multicollinearity among the independent and control variables, especially those denoting a firm's industry.

In addition, it may be that investors are responding to different variables than those studied herein. For instance, the scope of activities performed in the alliance and the governance structures employed to manage such activities may also be important to investors, as each potentially influences the resources made available and the likelihood of opportunism (Li et al., 2008; Oxley & Sampson, 2004). Further, as alliance management is critical to performance (Ireland et al., 2002; Rothaermel, 2001), perhaps investor responses to alliance formation by new ventures depend on signals regarding partner cooperation. Because the benefits of alliances depend greatly on inter-partner cooperation built over time (Dyer & Singh, 1998; Ireland et al., 2002), future work

approaching these questions from organizational learning (Mowery, Oxley, & Sampson, 1996), social capital (Koka & Prescott, 2002), and transaction costs perspectives (Luo, 2002b) are warranted. For similar reasons, future research examining accounting based and market based performance metrics over longer periods of time are recommended (e.g., Kale et al., 2002; Sorescu, Shankar, & Kushwaha, 2007).

Finally, perhaps the relationships shown in Figure 1 are more complex than those hypothesized. For instance, based on prior arguments, a partner's R&D resources can indicate a bargaining power advantage in technology alliances, and this advantage may be more likely when that partner is a large firm and the new venture is a small firm. As such, rather than the direct effects modeled herein, perhaps a partner's R&D resources interact with its size to influence investor perceptions. Similarly, rather than focusing on each firm's size independently, perhaps the moderator is the relative difference in size between the firms, as this can indicate the potential for opportunism (Alvarez & Barney, 2001; Hamel, 1991). Finally, the context in which signaling occurs influences the information communicated by a signal (Heil & Robertson, 1991; Ndofor & Levitas, 2004). Thus, future research might consider industry and other environmental moderators that affect the information alliances signal (e.g., Madhavan & Prescott, 1995; Park & Mezias, 2005).

Conclusions

The resources accessed through alliances may sometimes provide useful signals to investors about a new venture's performance potential. As noted, observing signaling and understanding the information that is signaled are not synonymous. Similarly, although arguments presented throughout suggest that alliances facilitate access to

resources, our knowledge of the signals associated with this access is incomplete. In response, my theory integrated arguments from signaling theory and resource-based theory on strategic alliances. Though support for the hypothesized effects was limited, this study contributes to our knowledge in at least three respects.

The first contribution is based on the two hypotheses concerning the benefits of endorsement and gaining access to resources for new ventures about which there is uncertainty and on the two concerning the benefits of endorsement and gaining access to the resources of large firms. In general, there was limited support for the first two hypotheses and no support for the second two hypotheses. As noted, it is possible that marketing and technology alliances enhance investor uncertainty in some respects. Also, undergoing an IPO and the age and size of the sampled firms may have reduced the importance of signaling in this context. Regarding the benefits of partnering with large partners, consistent with research suggesting that the value of increasingly large size is limited and perhaps disadvantageous (Hitt et al., 1997; Lu & Beamish, 2004), investors may also perceive that partnering with large firms has shortcomings. Alternately, in identifying how the value of an alliance with a particular partner serves as either an endorsement or a signal of access to large resource endowments, the study's results suggest that investors consider factors other than large size (e.g., Stuart et al., 1999).

The second contribution is based on the predictions that prior alliance formation would provide investors a history of signals on which to evaluate subsequent alliances and would also be a source of knowledge and skills pertaining to alliance management. The lack of support for these hypotheses may suggest that investors consider general alliance experience unimportant. However, both Anand and Khanna (2000) and Kale et

al. (2000) found evidence that experience produces beneficial learning effects that enhances the value of subsequent joint ventures. Conversely, Zollo et al. (2002) identified no benefits of general alliance experience, and both Hoang and Rothaermel (2005) and Sampson (2005) found evidence of diminishing returns to experience. The learning literature cautions that the tendency to over-generalize experience from one learning event to the next increases the value of different but related experience (Ahuja & Lampert, 2001; Holcomb et al., 2008; Levinthal & March, 1993). Thus, through clearly speculative, perhaps investors attend to prior experience with a marketing or technology alliance when evaluating the potential of the respective alliance announcements. Alternately, it is possible to speculate that the returns to experience are indeed curvilinear such that early increases in experience raise market returns whereas later increases are less valued or discounted.

The third contribution is based on earlier arguments that signal consistency and partner resources similar to those accessible through an alliance would enhance the value of the signal and provide positive information to investors evaluating recently public new ventures. Four hypotheses predicted relationships among partners' resources and those accessible through the alliance. The only significant evidence in support of these four hypotheses is that a partner's new product introductions per year are positively related to the CARs associated with a marketing alliance announcement. However, analysis of the control variables reveals some support for a positive relationship between new venture R&D resources and the CARs associated with a marketing alliance, suggesting that investors may also value complementarity with respect to the partners' resources and the activities associated with the alliance. In the technology alliances,

there was limited evidence both in support and in contrast to complementarity. Although the two hypotheses about complementarity produced no statistically significant results, the measure was based more on participating in different industry segments than on the partner's actual resources. Thus, in addition to the possible benefits of consistency and similarity, there is tentative evidence that investors also consider complementarity when evaluating alliance formation by new ventures.

In sum, this research analyzed investor reaction to marketing and technology alliance announcements from an integrated perspective based on signaling theory and resource-based theory on strategic alliances. The study's hypothesized and non-hypothesized results, as well as the lack of support for many variables, add to our knowledge of investor reaction to the strategic alliances formed by new ventures and suggest implications that could facilitate future research in this area. Hopefully, this dissertation will be a catalyst for such inquiry.

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